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FM 17-67

WAR DEPARTMENT FIELD MANUAL

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CREW DRILL AND SERVICE OF THE PIECE, MEDIUM TANK M4

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WAR DEPARTMENT • 5 AUGUST 1944

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FM 17-67

This manual supersedes FM 17-67, 9 April 1943

CREW DRILL AND
SERVICE OF THE PIECE,
MEDIUM TANK M4



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FM 17-67, Crew Drill and Service of the Piece, Medium Tank M4, is published for the information and guidance of all concerned.

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BY ORDER OF THE SECRETARY OF WAR:

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Chief of Staff.

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The Adjutant General.

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(For explanation of symbols see FM 21-6.)

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SECTION I

GENERAL

1. PURPOSE AND SCOPE. This manual is designed to present instructional material for the platoon leader and tank commander in training the members of the crew of the medium tank M4 for combat. It is to be used as a guide to achieve orderly, disciplined, efficient execution of mounted and dismounted action; and precision, accuracy, and speed in the service of the piece. It provides a logical and thorough routine for all inspections of the vehicle and its equipment.

2. REFERENCES. See FM 21-6 and 21-7.

* For military terms not defined in this manual see TM 20-205.

SECTION II

CREW COMPOSITION AND FORMATIONS

3. COMPOSITION. The medium tank crew is composed of five members:

Tank Commander..(LIEUTENANT or SERGEANT)

Gunner(GUNNER)

Bow gunner (assistant driver (radio operator
in tanks equipped with SCR-506)).....(BOG)

Tank driver(DRIVER)

Cannoneer (loader and assistant gunner)
(tends voice radio).....(LOADER)

4. FORMATIONS. a. Dismounted posts. The crew forms in one rank (fig. 1). The tank commander takes post 2 yards in front of the right track, facing the front. The gunner, bow gunner, driver, and cannoneer, in order take posts on the left of the tank commander at close interval.

b. Mounted posts. The crew forms mounted as follows:

(1) *Tank commander.* In the turret, standing on the floor, or sitting or standing on the rear turret seat.

(2) *Gunner.* On the gunner's seat, on the right of the gun.

(3) *Bow gunner.* In the bow gunner's seat.

(4) *Driver.* In the driver's seat.

(5) *Cannoneer.* In the turret, on the seat at the left of the gun.

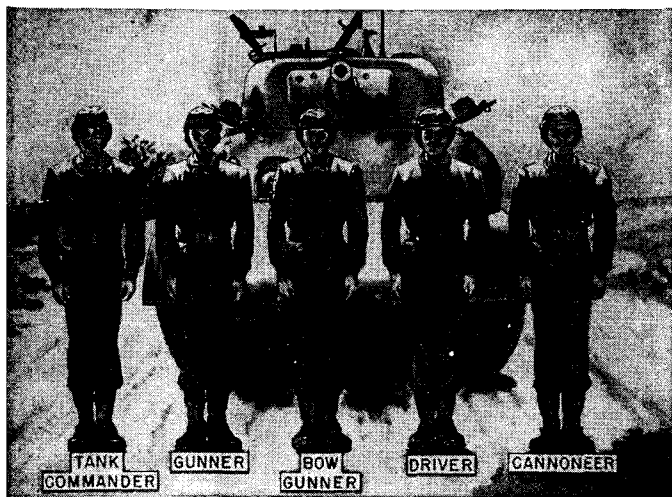


Figure 1. Medium tank crew, dismounted posts.

SECTION III

CREW CONTROL

5. OPERATION OF INTERPHONE AND RADIO. a.

The crew must practice continually with the interphone to obtain its maximum value during combat. It will be used for tank control during operation of the vehicle, radio operation being interrupted during that time.

(1) As standard operating procedure, after mounting, headsets and microphones are put on and tested according to the following procedure:

(a) *Cannoneer.*

1. Turns OFF-ON switch of radio receiver to ON.
2. Turns OFF-ON switch of transmitter (SCR-508, SCR-528) or interphone amplifier (SCR-538) to ON. (Allow 30 seconds for tubes to warm on receiver and interphone amplifier.)
3. Pushes button of the assigned channel number until it locks.

(b) *Crew members.* Each crew member inserts the plug of the short cord, extending from his earphones, into the break-away plug of the headset extension cord of his interphone control box. The microphone is fastened securely in its proper position on the throat or lip to produce maximum clarity of transmission. The microphone is connected to the break-away plug on the microphone cord of the control box.

(c) *Commander.* The tank commander turns his radio-interphone switch to INTERPHONE, depresses the switch on his microphone cord, and orders: CHECK INTERPHONE. (This command is used when the crew mounts by any other method than the formal drills given in paragraphs 8, 9, or 29. In those drills the "Ready" report constitutes the interphone check.) Each member of the crew in the following order:

gunner, bow gunner, driver, cannoneer, depresses his microphone switch and reports: "Bog check," "Loader check," etc. During this procedure, each crew member adjusts the volume control on his interphone control box to the desired level. *Care must be taken that the microphone switch does not remain in the locked position.* The electric cords and the suspension strap must not be wrapped around the hand switch for stowage lest they press down on the switch button and cause the dynamotor to burn out.

(2) *Control box positions.* Interphone control box positions are as follows:

(a) *Driver.* On hull roof or compass bracket above transmission.

(b) *Bow gunner.* On hull roof or compass bracket above transmission.

(c) *Gunner.* On right wall of turret to his right.

(d) *Tank commander.* On right wall of turret next to gunner's control box. (On older model tanks, he may plug directly into MIC and PHONES jacks on the radio.) He controls his transmission by manipulating the switch on his control box, marked RADIO-INT, to the type of transmission desired.

(e) *Cannoneer.* On left wall of turret to his rear beside the radio.

(3) *Switches.* The RADIO-INT switches on all control boxes, except the tank commander's, *must be set on RADIO.* This is the normal position for interphone operation. The tank commander's switch will be set at RADIO most of the time; he will change it to INT only as he desires to communicate with the crew. Except in an emergency, *no one but the tank commander* may operate the RADIO-INT switch on his control box. In an emergency, a member of the tank crew may break in while the tank commander is on RADIO by throwing his control box switch to INT. When the tank commander is on RADIO, throwing any RADIO-INT switch to INT will interrupt the tank commander's radio communication and establish interphone communication.

b. First echelon radio check. As a part of the daily "before operation inspection," the tank commander will make the following first echelon radio check:

(1) *Cords.* (a) See that insulation and plugs are dry, unbroken, and making good contact.

(b) Arrange loose cordage to prevent its entangling personnel or equipment.

(2) *Antenna.* See that—

(a) Mast is complete, sections taped and tight.

(b) Leads at transmitter, receiver, and mast base are tight.

(c) Mast base is tight and not cracked.

(d) Insulators passing through armor plate and bulkheads are whole and in place.

(3) *Set mountings, snaps, snubbers, etc.* Check for security and condition.

(4) *Microphones, switches, and headsets.* Check for condition and proper position. Replace from spares if necessary and turn in defective items for repair or replacement.

(5) *Spare antenna sections.* See that they are correctly placed in the roll and stowed to avoid being damaged or interfering with personnel.

(6) *Ground lead.* Check connection at both ends.

(7) *Tubes.* See that they are firmly seated in their sockets. Turn in defective tubes at the earliest opportunity.

(8) *Fuses.* Check condition and spare supply for numbers and proper rating.

(9) *Cleanliness.* See that both radio and equipment are clean.

(10) *Battery voltage.* Have driver check. If low, warn loader to start auxiliary generator (have started whenever radio is operated continuously and tank engine not running).

(11) *Crystals.* Check for number, position, and frequency. Be sure required crystals are present.

c. It is the duty of each man invariably to check his personal interphone equipment upon mounting the tank; he should see that it is properly maintained, and report any difficulties to the tank commander.

d. Definite tank control, commands, and terminology are set forth in paragraph 6. The desirability and necessity of adhering to this specific language cannot be overemphasized. General conversation on the interphone causes misunderstanding and disorder and is harmful to discipline.

6. INTERPHONE LANGUAGE. a. Terms.

Tank commander	LIEUTENANT or SERGEANT
Driver	DRIVER
Gunner	GUNNER
Cannoneer	LOADER
Bow gunner	BOG
Any tank	TANK
Armored car	ARMORED CAR
Any unarmored vehicle.....	TRUCK
Any antitank gun.....	ANTITANK
Infantry	DOUGHS
Machine gun	MACHINE GUN
Airplane	PLANE

b. Commands for movement of tank.

To move forward.....	DRIVER MOVE OUT
To halt	DRIVER STOP
To reverse	DRIVER REVERSE
To decrease speed.....	DRIVER SLOW DOWN
To turn right 90°.....	DRIVER CLOCK 3— STEADY ON
To turn left 60°.....	DRIVER CLOCK 10— STEADY ON
To turn right (left) 180°....	DRIVER CLOCK 6 RIGHT (LEFT)— STEADY ON
To have driver move toward a terrain feature or reference point, the tank being headed in proper direction.....	DRIVER MARCH ON WHITE HOUSE (HILL, DEAD TREE, ETC.)
To follow in column.....	DRIVER FOLLOW THAT TANK (DRIVER FOLLOW TANK NO. B-9)

To follow on road or trail... DRIVER RIGHT ON
ROAD (DRIVER
RIGHT ON TRAIL)
To start engine..... DRIVER CRANK UP
To stop engine..... DRIVER CUT ENGINE
To proceed in a specific gear. DRIVER THIRD GEAR
(FIRST GEAR)
(FOURTH GEAR)
To proceed at same speed.... DRIVER STEADY

c. Commands for control of turret.

To traverse turret..... GUNNER TRAVERSE
LEFT (RIGHT)
(REAR)
To stop turret traverse..... GUNNER STEADY
. ON

d. Fire orders. See FM 17-12.

SECTION IV

CREW DRILL

7. DISMOUNTED DRILL. a. To form medium tank crew. Being dismounted, the crew takes dismounted posts (fig. 1) at the command **FALL IN**.

b. To break ranks. Crew being at dismounted posts at the command **FALL OUT**, the crew breaks ranks. Crew members habitually fall out to the right of the tank.

c. To call off. Crew being at dismounted posts, at the command **CALL OFF**, the members of the crew call off in turn as follows:

- (1) Tank commander
....."SERGEANT" (or "LIEUTENANT")
- (2) Gunner "GUNNER"
- (3) Bow gunner "BOG"
- (4) Driver "DRIVER"
- (5) Cannoneer "LOADER"

d. To change designations and duties. (1) Crew being at dismounted post, at the command **FALL OUT SERGEANT (GUNNER) (DRIVER)**—

(a) The man designated to fall out moves by the rear to the left flank position and becomes cannoneer.

(b) The crew members on the left of the vacated post move smartly to the right one position and prepare to call off their new designations.

(c) The acting tank commander starts calling off as soon as the crew is re-formed in line.

(2) The movement may be executed by having any member of the crew fall out except the cannoneer.

(3) All movements should be executed with snap and precision and at double time.



Figure 2. Mounting through hatches, medium tank with single turret hatch.

8. TO MOUNT MEDIUM TANK CREW (fig. 2). Crew being at dismounted posts.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PREPARE TO MOUNT.				
About face.	About face.	About face.	About face.	About face.
Command: MOUNT.				
Stand fast.	Mount right fender.	Stand fast.	Stand fast.	Mount left fender.
Mount right fender.	Mount right sponson.			Mount left sponson.
Mount right sponson.		Mount right fender.	Mount left fender.	Enter turret and take mounted post.
	Enter turret and take mounted post.	Enter Bog's hatch and take mounted post.	Enter Driver's hatch and take mounted post.	Turn radio on.
Enter turret and take mounted post.	Connect break-away plugs.	Connect break-away plugs.	Close radio and battery switches.	Connect break-away plugs.
Connect break-away plugs.			Connect break-away plugs.	
Command: REPORT.				
	Report "Gunner ready."	Report "Bog ready"	Report "Driver ready."	Report "Loader ready."

9. TO MOUNT MEDIUM TANK CREW (tanks equipped with cannoneer's hatch). Crew being at dismounted posts.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PREPARE TO MOUNT.				
About face.	About face.	About face.	About face.	About face.
Command: MOUNT.				
Stand fast.	Mount right fender.	Stand fast.	Stand fast.	Mount left fender.
Mount right fender.	Mount right sponson.	Stand fast.	Mount left fender.	Mount left sponson.
Mount right sponson.	Enter turret and take post.	Mount right fender.	Enter Driver's seat.	Enter turret and take post.
Enter turret and take post.	Connect break-away plugs.	Enter Bog's seat.	Close radio and battery switches.	Turn on radio.
Connect break-away plugs.		Connect break-away plugs.	Connect break-away plugs.	Connect break-away plugs.
Command: REPORT.				
	Report "Gunner ready."	Report "Bog ready."	Report "Driver ready."	Report "Loader ready."

10. TO CLOSE AND OPEN HATCHES. a. To close hatches. Crew being at mounted posts.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: CLOSE HATCHES.	Release turret travers- ing lock and insure that turret weapons do not block hatches.			
Close hatch.		Close hatch.	Close hatch.	Close hatch. ¹
Raise periscope.		Raise periscope.	Raise periscope.	Raise periscope. ²
Command: REPORT.	Report "Gunner ready."	Report "Bow ready."	Report "Driver ready."	Report "Loader ready."

¹Tanks with cannoneer's hatch.

²M4 tanks, 76-mm only.

b. To open hatches. Crew being at mounted posts.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: OPEN HATCHES.				
Lower periscope.	Release turret traversing lock and insure that turret weapons do not block hatches.	Lower periscope.	Lower periscope.	Lower periscope. ¹
Open hatch.		Open hatch.	Open hatch.	Open hatch. ²
Command: REPORT.				
	Report "Gunner ready."	Report "Bog ready."	Report "Driver ready."	Report "Loader ready."

¹M4 tanks, 76-mm only.

²Tanks with cannoneer's hatch.

11. TO DISMOUNT MEDIUM TANK CREW. Crew being at mounted posts, turret weapons clear of hatches.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PREPARE TO DISMOUNT.				
Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs. Open battery and radio switches.	Disconnect break-away plugs. Turn radio off.
Command: DISMOUNT.				
Emerge from turret.	Stand fast.	Emerge from hatch.	Emerge from hatch.	Stand fast.
Move to right sponson.	Emerge from turret.	Move to right fender.	Move to left fender.	Move to commander's seat.
Move to right fender.	Move to right sponson.	Take dismantled post.	Take dismantled post.	Emerge from turret.
Take dismantled post.	Stand fast.			Move to left sponson.
	Move to right fender.			Move to left fender.
	Take dismantled post.			Take dismantled post.

12. TO DISMOUNT MEDIUM TANK CREW (tanks equipped with cannoneer's hatch). Crew being at mounted posts, turret straight ahead.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PREPARE TO DISMOUNT.				
Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs. Open battery and radio switches.	Disconnect break-away plugs. Turn off radio.
Command: DISMOUNT.				
Emerge from turret.	Stand fast.	Emerge from hatch.	Emerge from hatch.	Emerge from turret.
Move to right sponson.	Emerge from turret.	Move to right fender.	Move to left fender.	Move to left sponson.
Move to right fender.	Move to right sponson.	Take dismantled post.	Take dismantled post.	Move to left fender.
Take dismantled post.	Move to right fender. Take dismantled post.			Take dismantled post.

13. TO DISMOUNT THROUGH ESCAPE HATCH. Without weapons, crew being at mounted posts.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: THROUGH ESCAPE HATCH, PREPARE TO DISMOUNT.				
Disconnect break-away plugs.	Disconnect break-away plugs. Traverse turret to give access from Loader's to Bog's compartment.	Disconnect break-away plugs. Open escape hatch.	Disconnect break-away plugs. Help Bog open hatch Crawl from under Open battery and radio switches.	Disconnect break-away plugs. Turn radio off.
Command: DISMOUNT.				
Stand fast.	Stand fast. Move to left side of turret.	Dismount through escape hatch. Crawl from under tank and take dismounted post.	Stand fast.	Stand fast. Move into Bog's compartment and dismount.
Move to left side of turret.	Enter Bog's compartment and dismount.			Crawl from under tank and take dismounted post.
Enter Bog's compartment and dismount.	Crawl from under tank and take dismounted post.			
Crawl from under tank and take dismounted post.			Move to Bog's compartment and dismount. Crawl from under tank and take dismounted post.	

14. **PEP DRILL.** To vary the drill routine and to keep the interest of the crew members, unexpected periods of pep drill are introduced into the training. Pep drill (fig. 3) is a series of precision movements executed at high speed and terminating at the position of attention either mounted or dismounted. For example, the crews being dismounted, the platoon commander may command: IN FRONT OF YOUR TANKS, FALL IN; MOUNT; DISMOUNT; FALL OUT SERGEANT; ON THE LEFT OF YOUR TANKS, FALL IN; FORWARD, MARCH; BY THE RIGHT FLANK, MARCH; TO THE REAR, MARCH; MOUNT. Preparatory commands for mounting and dismounting are normally omitted from this type of drill. Posts of all crew members are changed frequently.

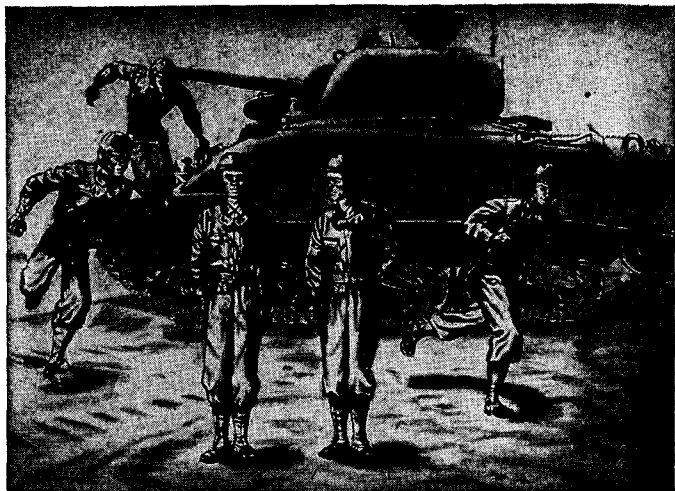


① FALL IN.



② MOUNT.

Figure 3. Pep drill.



③ DISMOUNT; ON THE LEFT OF YOUR TANKS, FALL IN.



④ BY THE RIGHT FLANK MARCH; MOUNT.

Figure 3. Pep drill—Continued.

SECTION V

SERVICE OF THE PIECE

15. **GENERAL.** a. The crew of the tank gun consists of the gunner, who aims and fires the piece; the cannoneer, who loads the piece; and the tank commander, who controls and adjusts fire.

b. Training in service of the piece must stress rapidity and precision of movement and teamwork.

16. **POSITIONS OF GUN CREW** (fig. 4). Positions of the gun crew are as prescribed in paragraph 4b.

17. **OPERATION OF GUN.** a. **To open the breech.** Grasp the grip portion of the operating handle, release the latch on the grip, and push the handle to the rear and right. *Immediately return the operating handle to its forward position and latch it.*

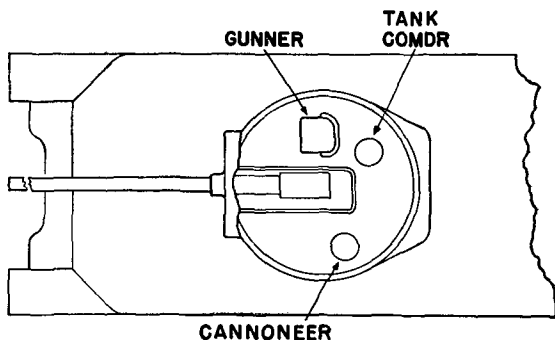


Figure 4. Gun crew, mounted posts.

b. To close the breech. The insertion of a round in the gun trips the extractors and causes the breechblock to close automatically. This feature makes it necessary to use care in closing the breech when the gun is unloaded. To close the breech, insert an empty shell case in the breech, base foremost, and trip the extractors. The breechblock will close, pushing the shell case forcibly to the left. If an empty shell case is not available, a block of wood of the proper size may be used. (A live round should not be used because of the danger of deforming the rim and causing a stoppage later on. Likewise do not use any piece of steel such as a wrench handle which would burr the extractors or chamber if it slipped off and were struck by the closing breechblock.)

c. Safety precautions. (1) Before firing, and during lulls in the firing, the gun will be inspected to see that there is no obstruction in the bore.

(2) The gunner must release the firing switch after firing to avoid injury to the cannoneer.

(3) The gunner waits for the cannoneer's signal that the gun is loaded and he is clear of the recoil before operating the firing switch.

(4) After firing, during range and combat practice, the gun will be inspected by an officer to see that it is unloaded before the tank is moved or personnel is allowed to move in front of it.

(5) In loading the gun, care must be taken not to strike the fuze or primer of a shell against any solid object; after loading, the loader must take care to remain clear of the path of recoil.

(6) Stuck rounds will be removed from the bore only with rammer, cleaning and unloading M3 or M4, which is made for this particular purpose. The method of removing is given in h and i below.

(7) Ammunition will be cleaned and inspected.

(8) Do not attempt to disassemble a fuze.

(9) When the breech is opened manually, immediately return the operating handle to its forward position and latch it.

(10) The fingers will not be used to trip the extractors.

(11) For safety requirements, see AR 750-10.

d. To load. (1) Open the breech and return the operating handle to its forward position. (Check engagement of latch.)

(2) Upon securing a round of ammunition, grasp it by the

base of the shell case with the right hand and with the left hand in rear of the ogive.

(3) Insert the round between the upper and lower frames of the shoulder guard and place the nose of the projectile in the breech recess, taking care not to strike the fuze against anything. Move the round forward until the nose of the projectile rests in the chamber, and remove the left hand from the round. Then, with the side of the right fist, vigorously push the round forward into the chamber, carrying the forearm in a plane roughly vertical to the axis of the bore. The automatic breechblock will push the hand to the left. Move the arm on to the left, clear of the path of recoil, and signal "Ready" by tapping the gunner's left leg with the foot.

e. To lay the gun. Bring the target into the field of the telescope by the quickest practicable method, under guidance of the tank commander or by use of the periscope. To lay for direction traverse until the center line of the telescope is on the target or until the proper lead is taken. Make the final traversing motion against the greatest resistance, such as might be caused by cant in the tank. Then move the gun until the target shows at the proper range as indicated by its relation to the range lines of the reticle. Adjustment is calculated so as to depress the muzzle with the final motion.

f. To fire the gun. With the left foot, depress the firing switch located on the floor in front of the gunner.* If the gun fails to fire, proceed as in paragraph 18. The gun may also be fired by depressing the mechanical foot firing pedal, to the left of the electrical firing button for the caliber .30 machine gun.

g. To unload an unfired round. The gunner cups his hands close behind the breech to catch the base of the round as it emerges and prevent it from slipping out and dropping to the floor. The cannoneer, by means of the operating handle, opens the breech *slowly*. (*Do not attempt to open the breech rapidly, or the case will become separated from the projectile.*) He then removes the round and returns it to its rack.

h. To remove a stuck projectile. If, in spite of care in opening the breech, the case and projectile do become separated,

* On medium tanks, 76-mm, and some later models of the standard medium the electrical firing switches may be located on the turret or gun control handles.

the chamber should be filled with rags to form a cushion, the breech closed, and the shell rammed loose as described in i below. In combat, to avoid exposing personnel, an unfired 75-mm howitzer case with charge reduced to Zone I will be found useful for firing out such stuck projectiles. Any spilled powder should first be removed from the chamber; the case is then inserted behind the stuck shell, and the gun is fired in the normal manner.

i. To unload a stuck round. When a round is stuck in the gun and it is either impossible or inadvisable to fire it out, it will be removed, except in combat, *under the direct supervision of an officer*. The breech being open, the cannoneer takes position to receive the round as it is pushed from the chamber, while the bow gunner or gunner dismounts and rams the round out (see c(4) above). Using the rammer, cleaning and unloading M3 or M4, insert rammer in the muzzle of the gun and push it gently down the bore until it is seated on the ogive of the projectile. Exerting a steady pressure, shove the round clear so that it may be removed by the cannoneer. If the weight of several men against the staff does not suffice (*under no circumstances will the staff be used to hammer against the projectile*), apply leverage by means of a 2 x 4 or other suitable object connected to the tank by a rope at one end, or use the rammer M1, which provides a controlled and properly cushioned blow. Keep all parts of the body as clear as possible from the muzzle or breech during the operation. If this procedure fails to remove the round, experienced ordnance personnel should be called. In combat, to avoid exposing personnel to enemy fire, the round can sometimes be pried out by using the base of an empty case as a lever.

j. Deformation of APC. Use of the rammer, as prescribed in i above, to unload stuck rounds of armor-piercing capped ammunition may deform the aluminum windshield or loosen it on the nose of the projectile. This may cause serious damage to the gun or at least have a marked effect on accuracy at ranges over 1,000 yards. Hence, if it is desired to use the round again and the windshield is observed to have been noticeably deformed or loosened, it should be removed entirely from the projectile. The latter will then have approximately the same ballistic characteristics as ordinary armor-piercing ammunition.

18. MALFUNCTIONS. Malfunctions of the gun may be divided into three general classes: **failure to load, failure to fire, failure to extract.** Below are given the causes of the principal types of failure and the immediate action remedy to be applied.

a. Failure to load.

<i>Failure</i>	<i>Cause</i>	<i>Immediate action and remedy</i>
Round does not fully enter chamber.	Stuck round.	Check for obstruction in chamber, and remove. Check for dirty round, and clean. Check for "bulged" (deformed) round, and drive into chamber using empty shell case or piece of 2 x 4 (held to one side of primer) as a drift. For removal of separated or stuck rounds see paragraph 17h and i above.
Breech does not close.	Insufficient force in pushing round home, to trip extractors.	Withdraw round and try again.
	Bent or undersized case rim.	Turn round so that rim engages extractors, or use new round.
	Obstruction, dirt or friction, in breech mechanism.	Remove obstruction, clean recess or other dirty part, lubricate.
	Worn or broken extractors.	Replace.
	Weak or loose closing spring.	Increase tension on spring to secure proper action.

b. Failure to fire.

<i>Failure</i>	<i>Cause</i>	<i>Immediate action and remedy</i>
Gun does not return to battery.	Obstruction between breech ring and rear portion of mount.	Drive out obstruction, or if necessary and jack is available, use tank jack between breech ring and shoulder guard bracket of mount, to release obstruction.
<i>If gun is in battery:</i>		
Action of trigger mechanism restricted.	Safety lever on "Safe."	Move lever to "Fire."
Blow of firing pin fails to fire round.	Defective round.	Recock gun and attempt to fire a <i>second</i> time. Remove round to determine cause of misfire. (See AR 750-10.) (See par. 17 for removal of live rounds.)
	Weak blow on primer due to obstruction, dirt, or friction in firing mechanism.	Disassemble, and remove obstruction; clean, lubricate.
	Broken tip on firing pin.	Replace firing pin.
	Broken or weak firing spring.	Replace firing spring.
Firing pin fails to strike primer.	Obstruction, dirt, or friction in firing mechanism.	Disassemble and remove obstruction; clean, lubricate.
	Weak or broken firing spring.	Replace.
	Defective firing pin.	Replace.
	Defective cocking lever.	Replace.
	Defective cocking fork.	Replace.
	Defective cocking lugs, on percussion mechanism.	Replace.
	Defective sear.	Replace.

c. Failure to extract.

<i>Failure</i>	<i>Cause</i>	<i>Immediate action and remedy</i>
Breech opens, but case is not extracted.	Broken extractors.	Pry or ram out empty case and replace extractors.
	Undersized or bent rim.	Pry or ram out.
Breech fails to open, or opens only partially.	Broken operating crank.	Remove case. Replace crank.
	Broken operating crank cam.	Remove case. Replace cam.

SECTION VI

MOUNTED ACTION

19. TO PREPARE TO FIRE. Crew being at mounted posts, hatches open. The antiaircraft gun is uncovered and half loaded as the tactical situation dictates.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PREPARE TO FIRE.				
Clean Gunner's, Loader's, and Sergeant's periscopes and gun telescope.	Unlock gun traveling lock; elevate gun. Release turret traversing lock; traverse left 800 mils. ¹	Lower seat. Release traveling lock. Half load bow gun. Clean periscope. Check ammunition.	Lower seat. Clean periscope. Check ammunition.	Inspect bore and chamber of tank gun. ²
	Check firing controls (including solenoids).			Start auxiliary generator. Raise periscope. Half load coaxial machine gun.

	Turn on and engage power traverse; check operation; traverse turret forward.			
Check vane sight.	Check periscope and sights. ³ Uncover and check elevation quadrant and azimuth indicator.			Inspect smoke mortar; load mortar.
Close hatch if desired.		Close hatch; raise periscope.	Close hatch; raise periscope.	
	Start and check operation of gyro-stabilizer (return gun to manual elevation unless ordered otherwise).			Check ready rounds, smoke bombs, and machine gun ammunition.
Command. REPORT.	Report "Gunner ready."	Report "Bog ready."	Report "Driver ready."	Report "Loader ready."

¹If necessary in order to expose generator.

²If tape muzzle cover is in place, inspection does not require its removal. If cover is unbroken no foreign material has entered the muzzle.

³Periscope will be already raised since after the initial adjustment for the day it should not be lowered. Lowering the periscope may spoil the adjustment.

20. DUTIES IN FIRING.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Give fire orders (FM 17-12).		Fire on designated targets and on emergency targets that appear.		Load type ammunition indicated in fire order (inspect each round).
Observe strike or trace and notify Gunner of changes in range or deflection.	Fire on targets designated. Continue to fire as directed.	When not firing, observe in assigned sector.	Operate tank at constant speed and as smoothly as possible.	Signal READY each time gun is loaded by tapping Gunner on left leg. Reload all turret weapons. See that all fuzes are at DELAY unless ordered otherwise.
Control driver with interphone.	Call "Misfire" if cannon fails to fire. Call "Stoppage" if coaxial gun fails to fire. Tell Loader when to fire coaxial gun if solenoid fails to operate.		Steer only to change course as directed by Sergeant, or to avoid obstacles. When about to pass over rough ground or change course, warn Gunner by calling "Rough" or "Changing course."	In case of misfire, check that breech is closed, gun in battery; recock gun and signal READY to Gunner. Reduce stoppages in coaxial machine gun. Fire coaxial gun by hand when directed by Gunner.

Fire AA gun (except on M4 tanks, 76-mm).

Determine when mortar smoke screen should be laid and give commands to produce the desired effect.

When ordered by Platoon Commander, adjust indirect fire from forward position.

Indicate aiming point to Gunner.

Rotate turret as directed by Sergeant in adjusting smoke screen.

In indirect fire: Lay gun for direction. Lay gun for elevation. Set off deflection. Fire gun on command. Make designated corrections in deflection and elevation.

During lulls in normal activity observe in assigned sector.

Fire AA gun (on M4 tanks, 76-mm only).

During lulls in normal activity observe in assigned sector.

Keep mortar loaded at all times; adjust range, and fire immediately on command of Sergeant.

Watch recoil and counterrecoil of gun; notify Gunner of necessary recoil control change. Keep record of ammunition expended for entry in gun book by Platoon Leader (number of rounds each type).

Inform Sergeant when ammunition needs to be restowed.

During lulls in normal activity observe in assigned sector.

32 21. TO SECURE GUNS.¹ In battle this operation is normally followed by "Restow Ammunition."

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: (CEASE FIRING) SECURE GUNS.				
Lower periscope.	Turn off firing switch; elevate tank gun.	Clear bow machine gun; engage traveling lock.	Lower periscope.	Clear coaxial machine gun.
Open hatch.			Open hatch (first check position of turret weapons).	Clear tank gun; inspect bore and close breech.
Clear AA machine gun. ³	Traverse turret left 800 mils. ²	Lower periscope.		
Raise and mount convoy seat.	Return turret to forward position (leave gun at maximum elevation).	Open hatch (first check position of turret weapon).	Raise seat to convoy position.	Shut off auxiliary generator.
				Clear smoke mortar.
				Open hatch (for tanks with Loader's hatch).
	Turn off power traverse; engage hand traverse.	Raise seat to convoy position.		Clear AA machine gun. ⁴
	Check sight adjustment.			

Lock gun in travel
position.⁵

Turn off gyrostabi-
lizer.

Engage manual ele-
vating mechanism.

Lock turret lock.

Command:
REPORT.

Report "Gunner
ready."

Report "Bog ready."

Report "Driver
ready."

Report "Loader
ready."

¹The above drill is the minimum number of operations required to put the tank in proper condition to march after it has been prepared for combat or after range practice. If time permits, additional operation and checks are performed. The gunner checks sight adjustment and covers the elevation quadrant bubble and the azimuth indicator. The tank commander may order the bores of all weapons swabbed and their muzzles taped.

²If necessary in order to expose generator.

³Except on M4 tanks, 76-mm.

⁴On M4 tanks, 76-mm only.

⁵Normally omitted in range procedure.

22. TO LOAD ALL WEAPONS. The tank gun is loaded on order. This is normally the fire order, but some types of action will dictate loading prior to the appearance of a target. Machine guns are clear until the command **PREPARE TO FIRE**, when they are half loaded. When the fire order is given, however, or if the unit is deployed for combat, all machine guns will be fully loaded. This does not necessarily apply to the antiaircraft gun, which is uncovered and half loaded as the tactical situation dictates.

23. USE OF AMMUNITION. The order of withdrawing ammunition from the racks is based on the principle of saving some ready rounds for emergency use. The driver and bow gunner will pass ammunition to the cannoneer, if necessary, to prevent his having to use these rounds. During combat the position of the turret will affect the accessibility of ammunition in various parts of the tank. In drill, however, to establish a sound method from which commanders may deviate as the need arises, the following procedure should be adhered to:

a. 75-mm gun. Ammunition is taken from the racks in the following order: ready racks on turret floor; forward racks, right sponson; racks beneath turret floor; rear racks, right sponson. Rounds in the ready clips and those in the left sponson are kept as a reserve for action where speed of loading is of utmost importance. This principle extends also to the order of withdrawing rounds from each succeeding section; the handiest will be kept to the last, though each section is completely emptied before the next is begun. Normally the racks beneath the turret and in the rear of the right sponson are emptied only to refill the more accessible racks; this process is carried on as time permits during the action.

b. 76-mm gun. Ammunition is withdrawn from the holders in an order which assumes the stowage space to be divided into three sections (see fig. 5). These are the front half of the diagonal racks left of the power tunnel; the rear half of the same group of racks; and the horizontal racks right of the power tunnel, behind the bow gunner. Sections are emptied in the order in which numbered; but in each section the handiest rounds are used last to provide for possible emergency. Sections 1 and 2 are emptied in turn from the ends toward the middle and section 3

from the bottom up. The ready rounds in the turret likewise are left untouched as a reserve for action where speed of loading is of the utmost necessity. Normally, section 3 is emptied only to refill sections 1 and 2; and this process is carried on as time permits during the action.

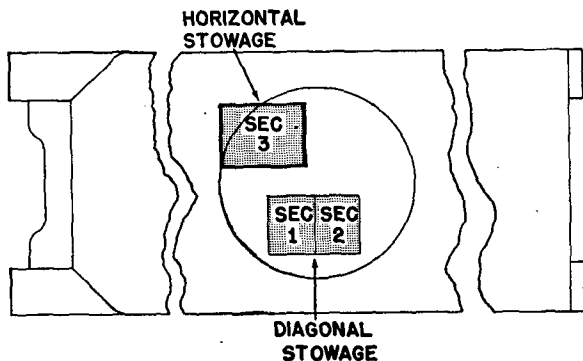


Figure 5. 76-mm ammunition stowage.

36 24. TO RESTOW AMMUNITION. Operation performed automatically during lulls in firing or at tank commander's order.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: RESTOW AMMUNITION.				
Supervise transfer of ammunition.	Relay ammunition from Bog to Loader or traverse turret if necessary to permit passing it direct.	Pass ammunition from beneath turret to Gunner or Driver, or direct to Loader.	Relay ammunition from Bog to Loader.	Receive ammunition from beneath turret; refill ready clips, ready racks, and left sponson.
	Traverse turret 400 mils right; ¹ pass ammunition to Loader or Bog from rear racks, right sponson.	Refill forward racks, right sponson from racks beneath turret or in rear of sponson.	Observe in assigned sector.	When racks beneath turret are empty, receive ammunition from rear racks of right sponson.
Receive AA ammunition from Gunner to insure fresh belt at the gun.	Pass caliber .50 ammunition to Sergeant if needed.	Receive caliber .30 ammunition to insure a fresh belt at the gun.	Pass caliber .30 ammunition to Bog and Loader if needed.	Receive and stow caliber .30 ammunition; insure a fresh belt at the gun.
Command: REPORT.	Report "One two HE, one one SHOT, nine SMOKE remaining in right sponson;			

Gunner ready" (indicating both racks full).

Report "One seven HE, one two SHOT remaining beneath turret; Bog ready."

Report "Driver ready."

Report "One six HE, one two SHOT in ready racks and left sponson; Loader ready" (indicating all racks full).

¹Only on tanks where basket cage makes traverse necessary.

38 25. TO RESTOW AMMUNITION (medium tanks, 76-mm). Operation performed automatically during lulls in firing or at tank commander's order.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: RESTOW AMMUNITION.				
Supervise transfer of ammunition.	Relay ammunition from Bog to Loader or traverse turret to facilitate passing it direct.	Pass 76-mm ammunition to Gunner or Driver or direct to Loader, emptying bottom racks first.	Relay ammunition from Bog to Loader.	Receive 76-mm ammunition and replenish racks — order: Ready racks (if not already reloaded from left stowage); diagonal racks front section, rear section, center to ends.
		Place fresh belt caliber .30 ammunition at bow gun.		Place fresh belt caliber .30 ammunition at coaxial gun.
	Pass box caliber .50 ammunition to Loader if needed.			Place fresh belt caliber .50 ammunition at AA gun.
	Pass caliber .30 ammunition to Loader if needed to replenish his rack.			Receive caliber .30 ammunition from Bog when own supply low or exhausted.

Command: REPORT.

Report "Gunner
ready."

Report "Eight SHOT,
one five HE, seven
SMOKE remaining
in right stowage. Bog
ready."

Report "Driver
ready."

Report "Two two
SHOT, one four HE
remaining in left
stowage and ready
racks. Loader
ready."

26. TO LOAD AMMUNITION. Ammunition for the tank gun should be loaded and stowed with great care to avoid striking the fuze end or the primer on a hard surface, burring the rotating band, or denting the case (see TM 9-1900). Each round is tried in the piece prior to stowing in the tank to see that it can be loaded. All rounds of HE will be set at FUZE DELAY at this time. Both cannon and machine-gun ammunition will be passed through the hatches or the pistol port as most convenient under the circumstances, a man being stationed on the forward or rear hull to relay it to those in the tank.

SECTION VII

DISMOUNTED ACTION

27. TO FIGHT ON FOOT THROUGH HATCHES. a. Crew being at mounted posts, hatches open. Crew members, including the tank commander, keep below hatches until completely ready to dismount and go into action and until the order DISMOUNT is given.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PREPARE TO FIGHT ON FOOT.				
Disconnect breakaway plugs.	Disconnect breakaway plugs.	Disconnect breakaway plugs.	Disconnect breakaway plugs.	Disconnect breakaway plugs.
Order distribution of grenades.	Procure grenades as ordered.	Pass tripod to Driver.	Receive tripod from Bog.	Procure grenades as ordered.
Take hand grenades, submachine gun and 6 clips caliber .45 ammunition.		Install elevating mechanism on bow gun; dismount gun; install pintle.		Take box cal. .30 ammunition.
		Procure grenades as ordered; take spare parts roll and spare bolt assembly.	Procure three boxes cal. .30 ammunition.	Help Driver get ammunition (M4 tanks, 75-mm (wet) and 76-mm only).
		Pass submachine gun and six clips caliber .45 ammunition to Driver.	Receive Bog's submachine gun and ammunition.	Stand fast.

Command:

DISMOUNT.

Dismount via right sponson and fender.

Receive two boxes caliber .30 ammunition from Driver.

Cover dismounting of other crew members.

Dismount to right sponson; receive bow gun from Bog.

Dismount with bow gun via right fender.

Pass bow machine gun to Gunner.

Pass two boxes caliber .30 ammunition to Sergeant.

Pass tripod to Loader.

Dismount to left sponson with box caliber .30 ammunition; receive tripod from Driver.

Dismount via left fender and mount tripod.

Help mount gun and man gun as No. 1.

Act as squad leader of machine-gun crew.

Mount bow machine gun and man gun as No. 2.

Dismount with spare parts roll and spare bolt assembly.

Receive box caliber .30 ammunition and submachine gun and ammunition from Driver.

Man gun as No. 3.

Pass box caliber .30 ammunition and submachine gun and ammunition to Bog.

Move into turret, connect break-away plugs, and maintain contact with Platoon Leader.

b. The dismounted crew moves to the position indicated by the tank commander or in drill, 5 yards in front of the tank (see figs. 6 and 7). The crew members take the posts and perform the duties of the crew of a ground-mounted machine gun as prescribed for gun drill in FM 23-55.

c. In combat it is assumed that the tank will be moved to a concealed position if possible, before the crew dismounts. Otherwise the driver will move the tank to a concealed position before mounting to the turret.

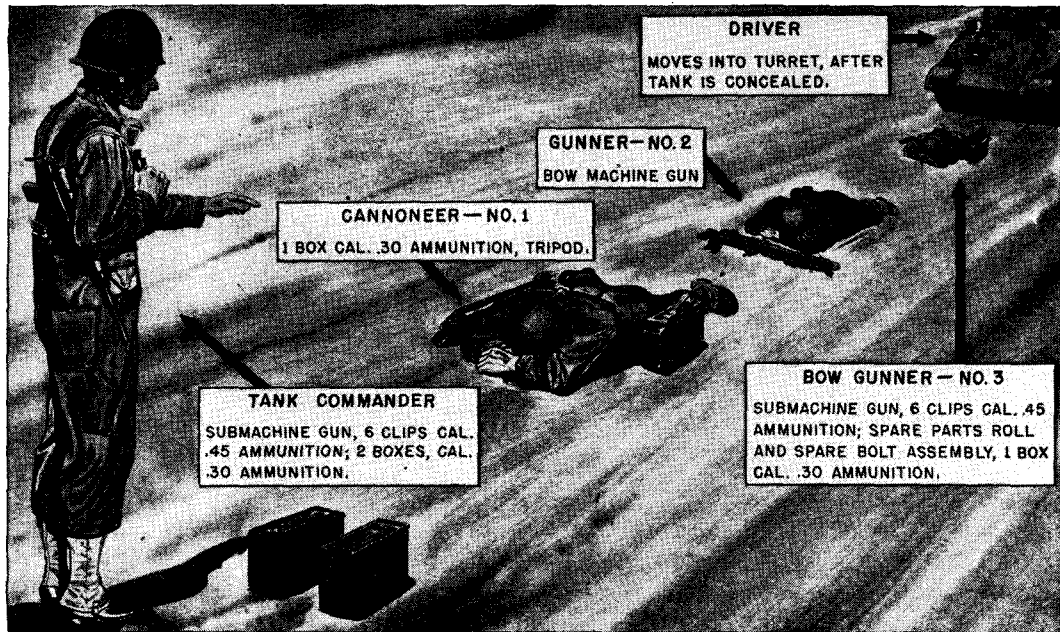


Figure 6. Dismounted action, crew formed for drill (tank commander instructing).

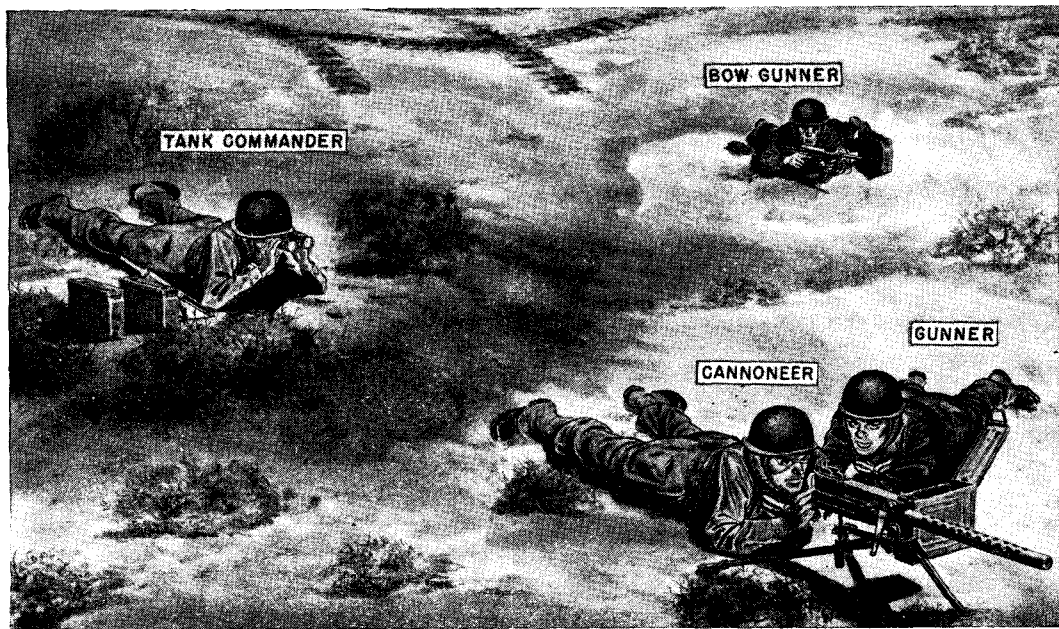


Figure 7. Posts of dismounted crew in action.

‡ 28. TO FIGHT ON FOOT THROUGH HATCHES (tanks with cannoneer's hatch). a. Crew being at mounted posts, hatches open. Crew members, including the tank commander, keep below hatches until completely ready to dismount and go into action and until the order DISMOUNT is given.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PREPARE TO FIGHT ON FOOT.				
Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.
Order distribution of grenades.	Procure grenades as ordered.	Pass tripod to Driver.	Receive tripod from Bog.	Procure grenades as ordered.
Take hand grenades, submachine gun and six clips caliber .45 ammunition.	Stand fast.	Install elevating mechanism on bow gun; dismount gun; install pintle.		Take one box caliber .30 ammunition.
Stand fast.		Procure grenades as ordered; take spare parts roll and spare bolt assembly.	Procure three boxes caliber .30 ammunition.	Help Driver get ammunition (M4 tanks, 75-mm (wet) and 76-mm, only).
		Pass submachine gun and six clips caliber .45 ammunition to Driver.	Receive Bog's submachine gun and ammunition.	Stand fast.

Command:
DISMOUNT.

Dismount via right
sponson and fender.

Receive two boxes caliber
.30 ammunition
from Driver.

Cover dismounting of
rest of crew.

Act as squad leader of
machine-gun crew.

Dismount to right
sponson; receive
bow gun from Bog.

Dismount with bow
gun via right fender.

Mount bow machine
gun; man gun as
No. 2.

Pass bow machine
gun to Gunner.

Dismount with spare
parts roll and spare
bolt assembly.

Receive box caliber
.30 ammunition and
submachine gun and
ammunition from
Driver.

Man gun as No. 3.

Pass two boxes caliber
.30 ammunition to
Sergeant.

Pass tripod to Loader.

Pass box caliber .30
ammunition and
submachine gun and
ammunition to Bog.

Move into turret, connect
break-away
plugs, maintain contact
with Platoon
Leader.

Dismount to left sponson
with box cal. .30
ammunition, receive
tripod from Driver.

Dismount via left fender;
mount tripod.

Help mount gun;
man gun as No.

46 b. The dismounted crew moves to the position indicated by the tank commander or, in drill, 5 yards in front of the tank (see figs. 6 and 7). The crew members take the posts and perform the duties of the crew of a ground-mounted machine gun as prescribed for gun drill in FM 23-55.

c. In combat, it is assumed that the tank will be moved to a concealed position if possible, before the crew dismounts. Otherwise the driver will move the tank to a concealed position before mounting to the turret.

29. TO REMOUNT FROM ACTION THROUGH HATCHES.

<i>Tk commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: OUT OF ACTION.				
Supervise taking gun out of action.	Dismount machine gun.	Take mounted post (leave caliber .30 ammunition and submachine gun and ammunition in front of tank).	Disconnect break-away plugs and resume mounted post.	Help dismount gun. Fold tripod.
Cover other crew members with sub-machine gun.	Pass bow machine gun to Bog.	Receive and mount bow gun (remove and stow ground accessories).	Receive tripod; place in Bog's compartment.	Pass tripod to Driver.
Pass remaining caliber .30 ammunition to Driver.	Mount to turret.	Stow spare parts roll and spare bolt assembly.	Receive remaining ammunition; stow or place near Loader.	Mount tank with remainder of box caliber .30 ammunition.

Pass Bog's submachine gun and ammunition to him.	Enter turret; take mounted post. ¹	Receive and stow submachine gun and ammunition.		Enter turret; take mounted post.
Mount to turret.		Stow tripod. Return grenades. Connect break-away plugs.	Connect break-away plugs.	Stow ammunition. Receive and stow grenades. Connect break-away plugs.
Return grenades.	Receive and stow grenades.			
Connect break-away plugs.	Connect break-away plugs.			
Command: REPORT.	Report "Gunner ready."	Report "Bog ready."	Report "Driver ready."	Report "Loader ready."

¹Follow Cannoneer on tanks with single turret hatch.

30. TO ABANDON TANK. If it becomes necessary to abandon tank, the crew proceeds as in paragraphs 11, 12, or 13, with the following changes or additions:

a. Time permitting deliberate action, the tank commander displays the flag signal: **DISREGARD MY MOVEMENTS**, and supervises the disabling of those weapons which remain in the tank. Backplates are removed from machine guns and the firing pin and guide from the tank gun. All similar spare parts are also removed. Individual weapons and maximum possible ammunition loads are carried. The driver dismounts in order with the rest of the crew.

b. Ordinarily the tank is abandoned as a result of a direct hit which either causes it to catch fire or disables it so that it becomes a vulnerable target. In such instances, there may be less than 5 seconds in which the crew can escape without further injury. At the command **ABANDON TANK**, crew members throw open hatches, climb out, jump to ground and take cover at a safe distance from the tank. It is particularly important in case of fire to hold the breath until clear of the vehicle. Inhaling the fumes and smoke of the fire may injure the lungs and will at least incapacitate the individual for a time.

31. TO DESTROY TANK. When the command **DESTROY TANK** is given, crew members first remove what equipment is to be carried away. They then destroy the tank, weapons, ammunition, and equipment to be left, as prescribed in section XI.

32. ACTION IN CASE OF FIRE. a. Fire in engine compartment. The first crew member to discover fire calls: **ENGINE FIRE.**

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.
Dismount to rear deck.	Traverse turret left to expose tool stowage. ¹	Dismount.	Pull ONE fixed extinguisher control handle; shut off engine.	Obtain hand tools and hand extinguisher.
Take hand tools and fire extinguisher from Loader.	Traverse to clear Driver's hatch. ¹	Take extinguisher from Driver.	Pass hand extinguisher to Bog.	Pass tools and extinguisher to Sergeant.
Start to open top engine doors.	Dismount to rear deck.	Go to rear of tank; unfasten rear engine doors, ready to open if needed.	Dismount.	Dismount.
If fixed extinguisher has not put out fire, use hand extinguisher through top doors or pull exterior control handle of second fixed extinguisher.	Unfasten top engine doors.	Use hand extinguisher through rear doors if ordered.	Go to rear of tank and assist.	Go to rear of tank and assist other crew members.

¹Only on tanks where basket cage makes traverse necessary.

b. Fire in air horn (applicable only to tanks equipped with radial engines). The first crew member to discover fire calls, **AIR HORN FIRE**.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.
Take hand tools from Loader; dismount.	Traverse turret left to expose tools. ¹	Dismount.	Race engine (if cranking, continue in attempt to start).	Obtain hand tools; pass to Sergeant.
Go to rear of tank; open rear engine doors.	Traverse to clear Driver's hatch. ¹		Remove cone from hand extinguisher nozzle.	Remove cone from hand extinguisher nozzle.
If racing engine has not put out fire, cut small hole with screwdriver in air horn-intake tube coupling.	Take hand extinguisher from Loader; dismount.	Take hand extinguisher from Driver; go to rear of tank.	Pass extinguisher to Bog.	Pass extinguisher to Gunner.
	Go to rear of tank; stand by to use extinguisher.	Insert extinguisher nozzle in hole made by Sergeant; operate extinguisher.	Dismount if ordered.	Dismount to rear deck; stand by to operate fixed extinguisher if ordered.

¹Only on tanks where basket cage makes traverse necessary.

c. **Fire in fighting compartment.** The first crew member to discover the fire calls: TURRET (or HULL) FIRE. The tank is stopped and the engine shut off. Fire extinguishers are passed to the men nearest the fire, and the crew members nearest them help in any way possible to extinguish the fire. The turret is traversed if necessary. The tank commander supervises the work and orders the crew to dismount if the fire gets beyond control.

33. ADVICE TO INSTRUCTORS. a. Disciplined and effective dismounted action requires long and arduous drill. Satisfactory results can be obtained only by painstaking repetition of each movement. The technique of mounting and dismounting of all crew members is observed in detail by the tank and platoon commanders and altered, if necessary, before habits are formed. Once each man has found the most efficient method of mounting and dismounting, he is encouraged to adhere rigidly to it.

b. Training in dismounted action is best undertaken in the field, rather than in the tank park. Crews are required to dismount to fight on foot on all types of terrain, and under every variety of simulated combat conditions, with full loads of ammunition. Rough terrain complicates the problem of dismounting through the escape hatch, and develops ingenuity and physical agility not possible in tank park training.

c. Instructors must explain and demonstrate to tank crews how necessary to their safety and success in combat is a high state of training in dismounted action. They must point out that dismounted action from a disabled tank taken under small arms fire usually is practicable only through the escape hatch, and that skill and practice in use of the escape will pay dividends. The crew keeps the escape hatch door clean and well lubricated so that its release is immediate and positive. Frequent inspection of the mechanism is made by the tank commander to see that the locking rods are not bent.

34. GENERAL PRECAUTIONS. a. **Fire prevention.** (1) Smoking in or on the tank is prohibited.

(2) During fueling, a crew member stands on the rear deck

holding a fire extinguisher with the nozzle trained on the fuel inlet, ready to use it instantly if needed.

(3) Use of gasoline for cleaning any part of the tank is prohibited.

b. Mounting and operating tank. (1) Crew members mount and dismount by the front of the tank except during range practice.

(2) Unnecessary contact with any part of the weapons or sighting equipment will be avoided. This includes—

(a) Stepping on the gun barrel, gun shield, or machine guns in mounting or dismounting.

(b) Supporting one's self by holding the tube, gun shield, or machine guns in mounting or dismounting.

(c) Use of the shoulder guard as a step in entering or leaving the turret.

(3) Crash helmets are worn at all times inside the tank.

(4) Safety belts are fastened when the tank travels cross country.

(5) In operating cross country, the tank commander warns the driver and crew when the tank approaches rough terrain.

(6) Where possible the driver avoids rough or uneven ground which might cause injury to the tank or crew.

(7) In traveling with hatches open over rough ground or through woods, crew members constantly check the engagement of the cover latching mechanism and the security of covers in the open position; the tank commander also checks to see that the hatch ring is securely locked.

(8) The antenna is lowered to prevent contact with low branches or low-hanging wires, especially those which may carry high-voltage electricity.

(9) The tank is driven in low range when being moved forward in confined spaces.

c. Park and bivouac precautions. (1) Sleeping underneath, behind, or in front of tanks should be prohibited.

(2) In moving a tank in park or bivouac—

(a) A guide is always employed to direct the movement.

(b) The guide's position is at least 10 feet in front of the tank and to one side, clear of its path, in directing the tank either forward or back.

(c) At night he is especially charged with seeing that the path ahead of and behind the tank is clear of personnel, particularly those sleeping on the ground.

(d) The guide moves at a walk to avoid stumbling on uneven ground.

d. Miscellaneous. (1) After machine guns are cleared a cleaning rod is pushed through the barrel and chamber to insure that the chamber is empty. A T-block is then inserted into the receiver.

(2) Tank weapons, except the antiaircraft gun, are fired only when the driver's and bow gunner's hatches are closed.

(3) Before turning on the power traverse a check is made to see that the driver and bow gunner are clear of the gun and their hatches closed.

(4) Care will be taken, while working about a running engine to keep fingers and hands away from fans, fan belts, drive shafts, and other moving parts.

(5) Gun ammunition will be securely stowed.

(6) Ammunition will not be carried on the rear deck.

SECTION VIII

EVACUATION OF WOUNDED FROM TANKS

35. GENERAL. Wounded members of the tank crew will normally be removed from disabled tanks by their fellow crew members. The operation requires the utmost speed to save the lives of those who are unhurt as well as of the casualty. A tank set afire by an enemy hit can trap its crew in a matter of seconds; and an enemy who has determined the range and disabled a tank with a direct hit will probably continue shooting until the vehicle burns. It is essential, therefore, that all crew members become extremely proficient in the quickest methods of removing one another from the tank. Speed is the primary requisite; care in handling will be stressed only where it has been possible to move the tank to cover. If the action has ceased momentarily, or the tank has been able to disengage itself without hindering the accomplishment of the mission, the casualty is removed on the spot and then carried to a protected place where emergency first aid is administered. Otherwise the action will be continued until such opportunity is presented.

36. METHODS EMPLOYED. The methods of evacuation described herewith are based on a two-man team, which is the largest number that can effectively work around a single hatch opening. In some cases* a third man will be able to give considerable help from inside by placing belts around the wounded man or by moving him to a position where he can be grasped from above. Speed will usually dictate that the casualty be grasped by portions of his clothing or by the arms for removal. If an arm is broken, however, or if there are other injuries which will be aggravated by such procedures and if time allows, some form of sling may be improvised which will relieve the part from further injury. Only equipment which is immediately available, like pistol belts, web belts, or field bag straps, will be used for this purpose. Suggested uses of some of these items,

as well as more elaborate techniques of evacuation, will be found in FM 17-80.

37. DRILL. a. The first member of the crew to discover that another is hit and so badly wounded as to require his removal calls: BOG (LOADER) (SERGEANT) WOUNDED. If the tank is not then actively engaged and the tank commander decides that evacuation is necessary, he commands: EVACUATE BOG. The other crew members, except as explained in next sentence, dismount, and the two nearest the hatch above the wounded man go to that hatch to act as the evacuation crew. If the man nearest the casualty in the tank sees that his help is needed, he stays inside and immediately starts to arrange a sling or take whatever other steps will speed the operation. One of the crew takes the first aid kit with him in dismounting, or it is removed at the first opportunity thereafter. The remaining crew member, if available, helps in lowering the casualty to the ground. Before leaving the wounded man, whose position is marked so that he will not be run over, the tank commander reports by radio that he has lost one or more men and gives the location where they may be found.

b. To evacuate Bog (driver). Tank commander commands: EVACUATE BOG.

<i>No. 1</i>	<i>No. 2</i>
Kneel on inner edge of hatch.	Take position to the outside rear of hatch.
Reach into hatch and grasp hands of casualty, straightening him in seat if necessary.	
Cross arms over chest.	Grasp nearest hand when arms are crossed.
Raise and rotate casualty so that he faces outward.	Raise casualty and help rotate him outward.
Seat casualty on front rim of hatch; support in this position while No. 2 jumps to ground.	Help seat casualty; jump to ground and go to front of tank.
Lower trunk into arms of No. 2.	Receive and support trunk of wounded man, holding it beneath arms around chest.
Lift legs out of hatch as No. 2 lowers body along slope plate.	Lower body along slope plate and support until No. 1 can reach ground and assist.
Jump to ground; help No. 2 place casualty in carry position.	Place casualty in carry position.
Carry casualty to protected area.	Help No. 1 carry to protected area.

c. *To evacuate cannoneer.* Tanks with single turret hatch. Tank commander commands: EVACUATE LOADER. He dismounts to rear deck to act as No. 1. The gunner as No. 2 moves the casualty under the raised gun breech. If time permits he traverses the turret until the hatch is near the center of the rear deck.

No. 1

No. 2

Take position on rear deck behind turret hatch.

Raise casualty as high as possible in hatch opening, holding around chest.

Grasp casualty under arms.

Raise casualty through hatch and seat on rear edge.

Help No. 1 raise casualty by lifting from below.

Hold casualty while No. 2 dismounts to rear deck.

Dismount to rear deck.

Pick casualty up in arms; carry to rear and lay along back edge of deck.

Help No. 1 pick up casualty and carry to rear of tank; jump to ground.

Help No. 2 lift trunk of casualty off tank; jump to ground.

Lift upper part of body off tank and support until No. 1 arrives to help.

Lift hips and legs off tank.

Carry casualty to protected area.

Help carry casualty to protected area.

SECTION IX

INSPECTIONS AND MAINTENANCE

38. GENERAL. a. The tank commander is responsible for seeing that all inspections are made. He receives reports from the various crew members relative to their individual inspections, and he indicates in his report anything requiring the services of maintenance personnel. In supervising first echelon maintenance, he uses his discretion in delegating additional responsibilities to other crew members.

b. Inspection covers all personal equipment and weapons, vehicle equipment and weapons, and mechanical features of the vehicle. In combat, it includes a check of the application of protective cream by the crew members. Checks of instruments, lights, siren, track, suspension system, and engine performance are made in accordance with provisions of the appropriate technical manual; the driver fills in his Driver's Report indicating required maintenance work. The Driver's Report should be carefully and thoroughly prepared. Any irregularity noted and entered on the report, which is not repaired before the tank is used again, should be reentered on the report continually until it has been properly taken care of.

c. *List of tools used in 1st echelon maintenance medium tank, M4 series is given below.*

No.	Quantity	Description
1	1	Bar, crow, pinch-point, 18 lb.
2	1	Bag, tool.
3	1	Sledge, blacksmith's, dble-face, 10 lb.
4	1	Wrench, box, 3-in. hex, 44 7/8 -in. long.
5	1	Fixture, track connecting and link pulling, consisting of— 1 Fixture (puller), right-hand, w/handle. 1 Fixture (puller), left-hand, w/handle.
6	1	Gun, lubr, hand, pressure, 15 oz.
7	1	Lubr, hose, hv-duty, including— Adapter, extension, hose type, lubr.

<i>No.</i>	<i>Quantity</i>	<i>Description</i>
8	1	Oiler, pump, S, 1 pt.
9	1	Chisel, machs, hand, cold $\frac{3}{4}$ -in.
10	1	Bar, socket wrench, extension, plain, $\frac{1}{2}$ -in. sq-drive, 10-in.
11	1	Bar, socket wrench,, extension, swv-grip, $\frac{1}{2}$ -in. sq-drive, 5-in.
12	1	File, A S, hand, sm, 8-in.
13	1	File, A S, three-sq, sm, 6-in.
14	1	Hammer, machs, ball peen, 32 oz.
15	1	Handle, cross, extension, socket wrench, $\frac{1}{2}$ -in. sq-drive, 8-in.
16	1	Handle, hinged, socket wrench, $\frac{1}{2}$ -in. sq-drive, 12-in. (w/crossbar).
17	1	Handle, "T," sliding, socket wrench, close-male-hd, $\frac{1}{2}$ -in. sq-drive, 11 in.
18	1	Handle, "T," sliding, socket wrench, close-male-hd, $\frac{3}{4}$ -in. sq-drive, 17 in.
19	1	Joint, universal, socket wrench, $\frac{1}{2}$ -in. sq-drive.
20	1	Kit, accessory, auxiliary generator, consisting of— 1 Rope, starting, auxiliary generator. 1 Screw driver, auxiliary generator. 1 Wrench, comb, open-end, and dble-hex box, alloy-S, $\frac{7}{16}$ -in. 1 Wrench, socket, spark plug, ext deep, $\frac{7}{8}$ -in. hex. 3 Plugs, spark.
21	1	Pliers, comb, slip-jt, 8 in.
22	1	Pliers, side-cut, fl-nose, 8 in.
23	1	Handle, socket wrench, ratchet, rvrs, $\frac{1}{2}$ -in. sq-drive, 9 in.
24	1	Screw driver, close quarter, 1 $\frac{3}{4}$ -in. blade.
25	1	Screw driver, close quarter, sq-stock, 1 $\frac{1}{2}$ -in. blade.
26	1	Screw driver, machs, ext-hv-duty, wood-insert-hdl, 5-in. blade.
27	14	Wrench, socket, $\frac{1}{2}$ -in., sq-drive, consisting of— 10 Socket, $\frac{1}{2}$ -in. sq-drive, dble-hex, $\frac{7}{16}$ to 1 $\frac{1}{8}$ in. 1 Socket, $\frac{1}{2}$ -in. sq-drive, dble-sq, $\frac{3}{8}$ in. 1 Socket, $\frac{3}{4}$ -in. sq-drive, dble-hex, 1 $\frac{1}{2}$ in.
28	1	Handle, socket wrench, speeder, swv-hdl and hdl grips, $\frac{1}{2}$ -in. sq-drive, 17 in.
29	1	Wrench, adj, sgle-end, 12-in.
30	1	Wrench, adj, sgle-end, 8-in.
31	1	Wrench, drain plug, final drive and differential, $\frac{3}{4}$ -in. hex.
32	1	Wrench, drain plug, transmission and oil tank, $\frac{9}{16}$ -in. hex.
33	6	Wrench, engrs, dble-hd, alloy-S, $\frac{5}{16} \times \frac{3}{8}$ — $\frac{15}{16} \times 1$ in.
34	7	Wrench, socket head set screw, $\frac{1}{8}$ — $\frac{3}{8}$ -in. hex.

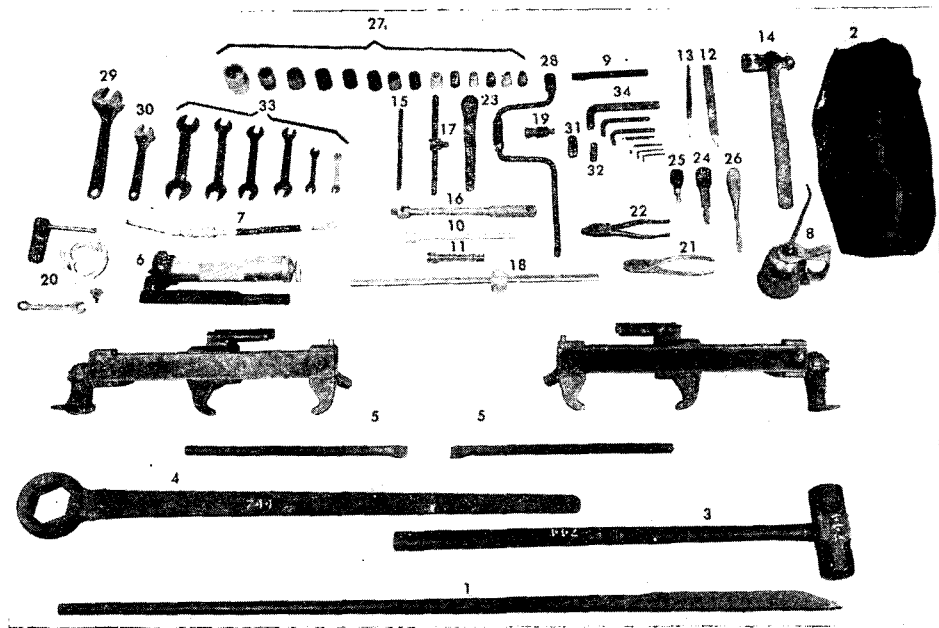


Figure 8. Tools used in 1st echelon maintenance medium tank, M4 series.

39. BEFORE OPERATION INSPECTION, M4, M4A1. Tank locked and covered by tarpaulin. (For training purposes, the inspection is divided into three phases, each phase being completed before the next is begun. Crew members secure tools as needed, report and correct deficiencies as found. The turret is traversed as necessary to facilitate the various operations.)

PHASE A

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: FALL IN; PREPARE FOR INSPECTION.				
Inspect crew.	Stand inspection.	Stand inspection.	Stand inspection.	Stand inspection.
Command: PERFORM BEFORE OPERATION INSPECTION.				
Begin trip ticket; fill out during inspection.	Help remove tarpaulin.	Inspect ground beneath tank for fuel or oil leaks.	Remove and fold tarpaulin (3' x 6').	Help remove and fold tarpaulin. Check outside equipment.
Supervise inspection made by other crew members.	Mount left sponson; unlock Driver's hatch; enter tank. ¹	Mount to rear deck via right fender and sponson.	Lay tarpaulin to right of tank.	
Inspect tracks and tank suspension.	Unlock Bog's hatch; clear bow gun; take oilcan.	Check fuel level including auxiliary generator tank.		

(Visual check adequate for daily inspection of wedge nuts.)

Move to turret.

Take rammer staff.³

Unlock hatch.

Open turret hatch.

Elevate gun; traverse turret left to expose hand tools and clear air inlet cover.

Raise air inlet cover.

Check oil reservoir breather.

Check clutch clearance.

Pass oilcan to Bog and hand tools to Driver.

Receive oilcan; lubricate clutch release bearings (outer race).³

Receive hand tools; lay out on tarpaulin and check.

Open rear engine doors to permit ventilation.

Receive and stow muzzle covers.

Close air inlet cover.

Check final drive oil (three-piece unit only).

Remove muzzle covers; pass to Gunner.

Remove and stow breech covers; clear turret guns.

Command: REPORT.

Report "Gunner ready."

Report "Bog ready."

Report "Driver ready."

Report "Loader ready."

¹Unlock and enter by Cannoneer's hatch on tanks so equipped; modify subsequent procedure accordingly.

²Not required on coaxial type.

³Except on M4 and M4A1, 75-mm (wet) and 76-mm.

PHASE B

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM PHASE B.				
Mount to rear deck; help Bog open doors.	Traverse turret manually one revolution to the left; check azimuth indicator. ¹	Open top engine doors.	Take mounted post.	Take mounted post.
Assist Gunner in sight adjustment.	Make sight adjustment.	Check the following: Crankcase breather.	Close radio and battery master switches.	Check pistol port.
Receive cleaning rods; swab bores of cannon and both machine guns.	Pass cleaning rods to Sergeant.	Engine compartment for fuel and oil leaks.	Check the following:	Check the following:
Return cleaning rods to Gunner.		Emergency cans of oil. ³	Steering levers.	Gun ammunition in turret and sponsons. ²
Apply tape muzzle covers. ⁴	Receive and stow cleaning rods.	Engine accessories for security and adjustment.	Gear shift lever, (place in neutral).	Auxiliary generator: operation, tools, spare parts. (Allow to run while power traverse and stabilizer are operated, and in cold weather prior to starting engine.)
Check all hatch covers.	Check power traverse mechanism and hydraulic oil.	Close top engine doors.	Parking brake.	
Dismount.	Level gun.	Dismount.	Clutch free travel.	
	Check gyrostabilizer; oil level, connections, cleanliness, operation.	Check:	Transmission oil level.	
	Turn off gyrostabilizer.	Hull drain valves in engine compartment.	Forward hull drain valves.	Water containers. ³
	Engage manual elevation; check mechanism.	Watch operation of fuel cut-off.	Oil dilution valve (early models).	Raise turret floor plate.
		Listen for booster buzz and click of oil dilution solenoid (early models).	Oil dilution valve and tank (later models).	Check:
			Priming pump operation.	Rations. ³
				Cooking stove. ³
				Open fuel valves.

Check firing controls.

Listen for operation of auxiliary fuel pump.

Turn handle of fuel filter one full turn (early models).

Push in and pull out cleaning control handle 10 times (later models).

Check air cleaners.

Turn engine over (50 turns with hand-crank).

Help Driver check lights.

Fuel cut-off operation.

Booster coil operation.

Auxiliary fuel pump operation.

Instruments.

Siren.

Compass.

Service lights and blackout lights.

Check:

Engine oil level.

Battery.

Hull drain valve, beneath turret.

Fixed fire extinguishers and controls.

Emergency cans of oil.⁵

Decontaminating apparatus.⁵

Drop turret floor plate.

Command: REPORT.

Report "Gunner ready."

Report "Bog ready."

Report "Driver ready."

Report "Loader ready."

¹ Traverse is made piecemeal and may be reversed for short distances to facilitate operations and checks.

² Ammunition left of power tunnel on M4 and M4A1, 76-mm. All gun ammunition on M4 and M4A1, 75-mm (wet).

³ Except in M4 and M4A1, 75-mm (wet) and 76-mm.

⁴ In bivouac and on nontactical marches, commanders will decide whether permanent type muzzle covers will be employed for convenience or greater protection.

⁵ On M4 and M4A1, 75-mm (wet) and 76-mm only.

PHASE C¹

<i>Tank commander</i> Command: PER- FORM PHASE C.	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Move to engine compartment.	Check the following:	Tighten exposed sprocket ring cap screws.	Start engine (operate at 800 rpm).	Help Gunner check tools and spare parts.
Check automatic oil filter.	Gun tools and spare parts.		During warm-up check:	Mount AA gun; attach cartridge and belt link bags; check gun and mount (adjust head space).
Observe condition of exhaust.	Stabilizer oil can.		Instruments.	Check the following:
Check engine for leaks, vibrating accessories, or parts.	Gun book.		Engine for smoothness of operation and unusual noises.	Coaxial gun and mount; attach cartridge bag (adjust head space).
	Manuals and accident form.		Magnetos.	Smoke mortar and bombs.
	Submachine gun, ammunition and personal equipment.		Drive tank forward at slow speed one tank's length.	Hand fire extinguisher.
	Safety belt.			Hand grenades.
Direct Driver to move tank forward one tank's length.	Spare antenna.	Close rear engine doors.		Caliber .50 ammunition. ²
Take post at right idler.	Cal. .50 ammunition.	Take post at left idler.		Caliber .30 ammunition.
Inspect that part of track not visible before.	Canvas bucket.	Inspect that part of track not visible before.	Drive tank to rear as directed by Bog.	Submachine gun, ammunition, and personal equipment.
Observe action and condition of support rollers, blocks, and tank suspension as tank moves to rear.	Check:	Direct Driver to move to rear; tighten inside cap screws as exposed.	Check the following:	
	Periscope, spare, and spare heads (including knob settings).	Place tools in bag.	Hood for Driver's hatch.	
	Gunner's quadrant and case.			
	Elevation quadrant.			
	Telescope and mount.			

	Receive tools and pass to Loader.	Pass tools to Gunner. ³	Decontaminating apparatus. ²	Receive tools from Gunner and stow.
Fold and pass tarpaulin to Gunner.	Secure tarpaulin to turret.	Open hatch.	Hand fire extinguisher.	Check:
Take mounted post.	Check gun and mount.	Take mounted post.	Caliber .30 ammunition. ²	Periscope, spare, and spare heads.
Check the following:		Check the following:		Safety belt.
Submachine gun, ammunition and personal equipment.	Clean chamber and breech mechanism.	Machine gun tools and spare parts.	Check lubrication order.	Connect break-away plugs.
Periscope, spare, and spare heads.	Check recoil oil.	Bow gun, mount, and ammunition; attach cartridge bag (adjust head space).	Manuals and accident form. ²	
Safety belt.	Lock gun and turret in traveling position.	Caliber .30 ammunition in right sponson. ⁴	Submachine gun, ammunition and personal equipment.	
Compass.	Connect break-away order.		Periscope, spare, and spare heads.	
Flag set.		Submachine gun, ammunition and personal equipment.	Safety belt.	
Binoculars.			Connect break-away plugs.	
Water containers. ⁴		Gun ammunition beneath turret right of power tunnel. ⁵		
Rations. ⁴				
Cooking stove. ⁴		Check:		
Mount antenna.		Escape hatch.		

PHASE C¹—Continued

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Make 1st echelon radio check.		Periscope, spare, and spare heads.		
Complete trip ticket.		Safety belt.		
Connect break-away plugs.		Tripod mount.		
		Connect break-away plugs.		
Command: REPORT (interphone check).				
Report "Ready" to Platoon Leader.				
	Report "Gunner ready."			
		Report "Bog ready."		
			Report "Driver ready."	
				Report "Loader ready."

¹The flame thrower, on tanks so equipped, is checked in this phase. The crew member using the weapon checks its condition, mechanism, and the fuel level in its tank in accordance with the appropriate published guide. Where it is an alternate weapon to the bow machine gun it is mounted on order of the tank commander.

²Except in M₄ and M₄A₁, 76-mm and 75-mm (wet).

³Pass tools direct to Cannoneer on tanks with Cannoneer's hatch.

⁴On M₄ and M₄A₁, 75-mm (wet) and 76-mm only.

⁵Except on M₄ and M₄A₁, 75-mm (wet).

40. INSPECTION DURING OPERATION, M4, M4A1. This is a continuous process for all crew members.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Remain alert to unusual noises or conditions.	Check operation of— Elevation and traversing mechanisms. Gyrostabilizer.	Watch instruments. Listen for unusual noises.	Check all instruments carefully. Check controls.	Check stowage of equipment in turret.
Check radio and interphone system.	Check security of— Turret lock.	Check security of bow gun.	Listen for unusual noises.	Check security of— Coaxial gun. Radio.
Check security of— Radio antenna.	Tank gun.			AA gun(on M4 and M4A1, 76-mm only).
AA gun (on M4 and M4 and M4A1, 76-mm).				
Outside fixtures and equipment.				

41. INSPECTION AT THE HALT, M4, M4A1. The length of halt determines how much of the following inspection will be completed and the normal priority of operations. The tank commander will be informed of the length of halt and will indicate how much time is to be allotted to inspection and how much for relief of the crew members. (During the inspection, the turret is traversed as necessary to facilitate those operations requiring it.)

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM HALT INSPECTION.				
Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.
Check radio for security.	Release turret lock.	Dismount.	Idle engine (run 4 to 5 minutes before stopping).	Turn on radio speaker.
Emerge from turret.	Elevate gun; check hand traverse.	Check final drives for leaks or excessive temperature.	Check instruments.	Move to AA gunner's post; man AA gun.
Clean all turret periscopes and telescope.	Check sight adjustment.	Check under tank for fuel or oil leaks.	Check Driver's and Bog's compartments for oil leaks.	
Supervise halt inspection.				
Inspect tracks and tank suspension.	Check auxiliary generator operation (leave on if necessary).	Check towing shackles.	Dismount; go to rear of tank. Open engine doors.	

Check coaxial gun
and mount.

Check smoke mortar.

Check engine oil
level.

Check operation of
gyrostabilizer.

Check power traverse.
Check firing controls.

Check gun and
mount.
Place gun in traveling
position.
Lock turret lock.
Check stowage of
equipment in turret.
Connect break-away
plugs.

Command: REPORT.

Report "Gunner
ready."

Help Driver check
lights.

Close engine doors.
Check air cleaners.
Mount to rear deck.
Check fuel level in
all tanks.
Check outside equip-
ment.
Take mounted post.
Clean periscope.

Connect break-away
plugs.

Report "Bog ready."

Check engine opera-
tion.

Inspect engine com-
partment.

Take mounted post.
Stop engine (use fuel
cut-off).

Check service and
blackout lights.

Check the following:
Steering levers.
Gear shift lever.
Parking brake.
Clutch free travel.
Transmission oil
level.

Clean periscope.

Check lubrication
plugs.

Report "Driver
ready."

Resume mounted post.
Turn off speaker.
Connect break-away
plugs.

Report "Loader
ready."

42. AFTER OPERATION MAINTENANCE, M4, and M4A1. **a.** After operation the tank is immediately given whatever servicing and maintenance is needed to prepare it in every way for further sustained action. This servicing covers all the points listed in the "Before operation inspection" and covers them in the same order with obvious modifications. (For example, the tank is locked at the end of the inspection instead of being unlocked at the beginning; the check for leaks under the tank is more effective after it has stood for a while; battery switches are turned off rather than on and only after all checks requiring use of battery power; equipment is covered and stowed rather than being uncovered and made ready for use.)

b. The tank will be completely cleaned, serviced, and replenished (fuel, oil (all types), grease, ammunition (all types), first aid kit, water, and rations). *All special precautions against fire will be observed while refueling.* Crew members will perform the following additional operations not covered in the Before Operation Inspection.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM AFTER OPERATION MAINTENANCE.				
Complete trip ticket; forward to Platoon Leader, together with report of any necessary 2nd eche- lon maintenance, fuel, lubricants, am- munition and rations required.	Clean all weapons.		Idle engine 4 to 5 minutes before stopping.	Help Gunner clean weapons.
		Help Driver clean tank.	Clean tank suspen- sion and outside of tank.	
		Help Gunner clean weapons.	Help Gunner clean weapons.	

72 43. PERIODIC ADDITIONAL SERVICES, M4, M4A1. Services performed weekly in garrison; in combat and on maneuvers they are performed after each field operation.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: FALL IN; PREPARE FOR INSPECTION.				
Inspect crew.	Stand inspection.	Stand inspection.	Stand inspection.	Stand inspection.
Command: PERFORM PERIODIC INSPECTION.				
Supervise inspection.	Drain sediment from fuel tanks. (50 hour)	Mount to rear deck; help Driver clean engine and engine compartment.	Open engine doors and clean engine and engine compartment.	Mount to turret.
	Mount to turret.			Clean batteries and case.
	Clean turret.		Take mounted post.	Test batteries with hydrometer.
	Clean and touch up any rust spots in turret.			Bring cells to proper water level.
	Dismount.	Operate and check hull drain valves in engine compartment.	Clean Driver's compartment and left interior of hull.	Operate auxiliary generator to charge batteries.
		Take mounted post.		Dismount.

Command: REPORT.

Report "Gunner
ready."

Report "Bog ready."

Report "Driver
ready."

Report "Loader
ready."

Clean Bog's compart-
ment and right in-
terior of hull.

Operate and check
hull drain valves in
Bog's compartment.

Operate and check
hull drain valves in
Driver's compart-
ment.

Tighten all wedge
nuts and inspect
track.

Drive tank forward
as required for tight-
ening wedge nuts.

Help Gunner tighten
wedge nuts and in-
spect track.

Help perform 250-
mile lubrication.

Help perform 250-
mile lubrication.

Perform 250-mile lu-
brication, referring
to appropriate guide.

Help perform 250-
mile lubrication.

Close engine doors.

Take mounted post;
clean and touch up
rust spots in Bog's
compartment.

Take mounted post;
clean and touch up
rust spots in Driver's
compartment.

44. BEFORE OPERATION INSPECTION, M4A2. Tank locked and covered by tarpaulin. (For training purposes, the inspection is divided into three phases, each phase being completed before the next is begun. Crew members secure tools as needed, report and correct deficiencies as found. The turret is traversed as necessary to facilitate the various operations.)

PHASE A

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: FALL IN; PREPARE FOR INSPECTION.				
Inspect crew.	Stand inspection.	Stand inspection.	Stand inspection.	Stand inspection.
Command: PERFORM BEFORE OPERATION INSPECTION.				
Begin trip ticket; fill out during inspection.	Help remove tarpaulin.	Inspect ground beneath tank for fuel, oil, or water leaks.	Remove and fold tarpaulin (3' x 6').	Help remove and fold tarpaulin.
				Check outside equipment.
Supervise inspection made by other crew members.	Mount left sponson; unlock Driver's hatch; enter tank. ¹	Mount to rear deck via right fender and sponson.	Lay tarpaulin to right of tank.	Remove muzzle covers; lay on tarpaulin.

Inspect tracks and tank suspension. (Visual check adequate for daily inspection of wedge nuts.)

Unlock Bog's hatch; clear bow gun; take oilcan.

Move to turret.

Take rammer staff.²

Unlock hatch.

Elevate gun; traverse turret left to expose hand tools.

Pass hand tools and oilcan to Driver.

Receive and stow muzzle covers.

Remove and stow breech covers; clear turret guns.

Report "Gunner ready."

Check the following levels:
Engine coolant.
Fuel (including auxiliary generator tank).
Engine oil.

Open turret hatch.

Receive hand tools and oilcan; lay out on tarpaulin and check.

Check final drive oil (3 piece unit only).

Remove muzzle covers; pass to Gunner.

Report "Bog ready."

Report "Driver ready."

Report "Loader ready."

Command: REPORT.

¹Unlock and enter by Cannoneer's hatch on tanks so equipped; modify subsequent procedure accordingly.

²Except on M4A2, 75-mm (wet) and 76-mm.

PHASE B

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PER- FORM PHASE B.				
Mount to rear deck; help Bog open doors.	Traverse turret man- ually one revolution to the left; check azimuth indicator. ¹	Open engine doors.	Take mounted post.	Take mounted post.
Assist Gunner in sight adjustment.	Make sight adjust- ment.	Check the following: Engine compart- ment for fuel, oil, or water leaks.	Close radio and bat- tery master switches.	Check pistol port.
Receive cleaning rods; swab bores of cannon and both machine guns.	Pass cleaning rods to Sergeant.	Emergency cans of oil. ³	Check the following: Steering levers.	Check the following: Gun ammunition in turret and spon- sons ² (each round). Auxiliary generator: operation tools, spare parts. (Allow to run while power trav- erse and stabilizer are operated, and in cold weather prior to starting engine.)
Return cleaning rods to Gunner.	Receive and stow cleaning rods.	Engine accessories for security and ad- justment.	Gear shift lever (place in neutral).	Water containers. ³
Apply tape muzzle covers. ⁴	Check power traverse mechanism and hy- draulic oil.	Hull drain valves in engine compart- ment.	Parking brake. Clutch free travel.	
Check all hatch covers.		Clutch lockouts. Transmission oil level.	Clutch free travel.	
Dismount.	Level gun.	Check air cleaners.	Forward hull drain valves.	Raise turret floor plate. Check: Rations. ³ Cooking stove. ³
		Dismount.		

Check gyrostabilizer;
oil level, connections, cleanliness, operation.

Turn off gyrostabilizer.

Engage manual elevation; check mechanism.

Check firing controls.

Help Driver check lights.

Operation of emergency stop.

(Do not test with engine running; SERIOUS DAMAGE WILL RESULT.)

instruments.

Siren.

Compass.

Service lights and blackout lights.

Open fuel selector valve.

Check:

Battery.

Hull drain valves beneath turret.

Fixed fire extinguisher and controls.

Emergency cans of oil.⁵

Decontaminating apparatus.⁶

Drop turret floor plate.

Command: REPORT.

Report "Gunner ready."

Report "Bog ready."

Report "Driver ready."

Report "Loader ready."

¹ Traverse is made piecemeal and may be reversed for short distances to facilitate operations and checks.

² Ammunition left of power tunnel on M4A2, 76-mm. All gun ammunition on M4A2, 75-mm (wet).

³ Except in M4A2, 75-mm (wet) and 76-mm.

⁴ In bivouac and on non-tactical marches commanders will decide whether permanent type muzzle covers will be employed for convenience or greater protection.

⁵ On M4A2, 75-mm (wet) and 76-mm only.

PHASE C¹

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM PHASE C.				
Move to engine compartment.	Check the following:	Tighten exposed sprocket ring cap screws.	Set hand throttles; lock out clutches; start engines (watch oil gauge).	Help Gunner check tools and spare parts.
Immediately engines are started, open bypass valves; leave open 2 to 3 minutes.	Gun tools and spare parts.			Mount AA gun; attach cartridge and belt link bags; check gun and mount (adjust head space).
Observe condition of exhaust.	Gun book.		Operate engines at 800-1000 rpm for five minutes.	Check the following:
Check engine for leaks, vibrating accessories or parts.	Manuals and accident form. ⁴			Coaxial gun and mount; attach cartridge bag (adjust head space).
	Submachine gun, ammunition and personal equipment.			Smoke mortar and bombs.
	Safety belt.		Stop engines to allow draining filters.	Hand fire extinguisher.
When engines are stopped, drain primary and secondary fuel filters.	Spare antenna.			Hand grenades.
Notify Driver when filters are drained.	Caliber .50 ammunition.		Restart engines when notified by Sergeant; (run until smooth).	Caliber .50 ammunition. ²
	Canvas bucket.		During warm-ups check:	Caliber .30 ammunition.
Close engine doors.	Check:		Instruments.	Submachine gun, ammunition, and personal equipment.
	Periscope, spare, and spare heads (including knob settings).		Engines for smoothness of operation, synchronization, unusual noises.	
Dismount; direct Driver to move tank forward one tank's length.	Gunner's quadrant and case.			
	Elevation quadrant.			
	Telescope and mount.			

Take post at right idler.	Check gun and mount. Clean chamber and breech mechanism.	Take post at left idler.	Drive tank forward at slow speed one tank's length.	Check: Periscope, spare, and spare heads. Safety belt.
Inspect that part of track not visible before.	Check recoil oil.	Inspect that part of track not visible before.		
Observe action and condition of support rollers, blocks, and tank suspension as tank moves to rear.	Lock gun and turret in traveling position.	Direct Driver to move to rear; tighten inside cap screws as exposed. Place tools in bag.	Drive tank to rear as directed by Bog. Check the following: Hood for Driver's hatch. Decontaminating apparatus. ² Hand fire extinguisher. Cal. .30 ammunition. ²	Receive tools from Gunner and stow.
Fold and pass tarpaulin to Gunner.	Receive tools and pass to Loader.	Pass tools to Gunner. ⁴ Open hatch.		Connect break-away plugs.
Take mounted post.	Secure tarpaulin to turret.	Take mounted post. Check the following: Machine gun tools and spare parts. Bow gun mount and ammunition; attach cartridge bag (adjust head space). Caliber .30 ammunition in right sponson. ³ Submachine gun, ammunition and personal equipment.	Check chart. Manuals and accident form. ³ Submachine gun, ammunition and personal equipment.	
Check the following: Submachine gun, ammunition and personal equipment. Periscopes, spare, and spare heads. Safety belt. Compass. Flag set. Binoculars.	Connect break-away plugs.		Periscope, spare, and spare heads. Safety belt.	

PHASE C¹—Continued

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Check the following: Water containers. ³ Rations. ³ Cooking stove. ³		Check the following: Gun ammunition be- neath turret right of power tunnel. ⁵	Connect break-away plugs.	
Mount antenna.		Check: Escape hatch. Periscope, spare, and spare heads. Safety belt. Tripod and mount. Connect break-away plugs.		
Make 1st echelon ra- dio check. Complete trip ticket. Connect break-away plugs.				
Command: REPORT. (interphone check).	Report "Gunner ready."	Report "Bog ready."	Report "Driver ready."	Report "Loader ready."
Report "Ready" to Platoon Leader.				

¹The flame thrower, on tanks so equipped, is checked in this phase. The crew member using the weapon checks its condition, mechanism, and the fuel level in its tank in accordance with the appropriate published guide. Where it is an alternate weapon to the bow machine gun it is mounted on order of the tank commander.

²Except in M4A2, 75-mm (wet) and 76-mm.

³On M4A2, 75-mm (wet) and 76-mm only.

⁴Pass tools direct to Cannoneer on tanks with Cannoneer's hatch.

⁵Except on M4A2, 75-mm (wet).

45. INSPECTION DURING OPERATION, M4A2. This is a continuous process for all crew members.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Remain alert to unusual noises or conditions.	Check operation of— Elevation and traversing mechanisms.	Watch instruments. Listen for unusual noises.	Check all instruments carefully. Check controls.	Check stowage of equipment in turret. Check security of—
Check radio and interphone system.	Gyrostabilizer.	Check security of bow gun.	Listen for unusual noises.	Coaxial gun.
Check security of— Radio antenna.	Check security of— Turret lock.			Radio.
AA gun (except on M4A2, 76-mm).	Tank gun.			AA gun (on M4A2, 76-mm only).
Outside fixtures and equipment.				

46. INSPECTION AT THE HALT, M4A2. The length of halt determines how much of the following inspection will be completed and the normal priority of operations. The tank commander will be informed of the length of halt and will indicate how much time is to be allotted to inspection and how much for relief of the crew members. (During the inspection, the turret is traversed as necessary to facilitate those operations requiring it.)

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM HALT INSPECTION.				
Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.
Check radio for security.	Release turret lock.	Dismount.	Idle engine (long enough for checks—stop within 5 minutes).	Turn on radio speaker.
Emerge from turret.	Elevate gun; check hand traverse.	Check final drives for leaks or excessive temperature.	Check instruments.	Move to AA Gunner's post; man AA gun.
Clean all turret periscopes and telescope.			Check Driver's and Bog's compartments for oil leaks.	
Supervise halt inspection.	Check sight adjustment.	Check under tank for fuel, oil, or water leaks.	Check engine synchronization.	
Inspect tracks and tank suspension.	Check auxiliary generator operation (leave on if necessary).	Check towing shackles.	Dismount to rear deck via left sponson.	
	Check coaxial gun and mount.		Open engine doors.	
	Check smoke mortar.		Check engine operation.	
	Check operation of gyro stabilizer.		Inspect engine compartment.	
	Check power traverse.	Help Driver check lights.	Take mounted post.	
	Check firing controls.	Mount to rear deck.	Stop engine.	
			Check service and blackout lights.	

Check gun and mount.	Check level of the following: Engine coolant. Engine oil. Fuel (all tanks).	Check the following: Steering levers. Gear shift lever. Parking brake. Clutch free travel. Transmission oil level.	
Place gun in traveling position.			
Lock turret lock.	Check air cleaners.		
Check stowage of equipment in turret.	Close engine doors.	Clean periscope.	
Connect break-away plugs.	Check outside equipment. Take mounted post. Clean periscope. Connect break-away plugs.	Connect break-away plugs.	Resume mounted post. Turn off speaker. Connect break-away plugs.
Command: REPORT.	Report "Gunner ready."	Report "Bog ready."	Report "Driver ready."
			Report "Loader ready."

47. AFTER OPERATION MAINTENANCE, M4A2. a. After operation the tank is immediately given whatever servicing and maintenance is needed to prepare it in every way for further sustained action. This servicing covers all the points listed in the Before Operation Inspection and covers them in the same order, with obvious modifications. (For example, the tank is locked at the end of the inspection instead of being unlocked at the beginning; the check for leaks under the tank is more effective after it has stood for a while; battery switches are turned off rather than on and only after all checks requiring use of battery power; equipment is covered and stowed rather than being uncovered and made ready for use).

b. The tank will be completely cleaned, serviced, and replenished (fuel, oil (all types), grease, coolant, ammunition (all types), first aid kit, water, and rations). *All special precautions against fire will be observed while refueling.* Crew members will perform the following additional operations not covered in the Before Operation Inspection.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM AFTER OPERATION MAINTENANCE.				
Complete trip ticket; forward to Platoon Leader, together with report of any necessary 2d echelon maintenance, fuel, lubricants, ammunition, and rations required.	Clean all weapons.		Idle engine 3-4 minutes before stopping.	Help Gunner clean weapons.
		Help Driver clean tank.	Clean tank suspension and outside of tank.	
		Help Gunner clean weapons.	Help Gunner clean weapons.	

88 48. PERIODIC ADDITIONAL SERVICES, M4A2. Services performed weekly in garrison; in combat and on maneuvers they are performed after each field operation.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: FALL IN; PREPARE FOR INSPECTION.				
Inspect crew.	Stand inspection.	Stand inspection.	Stand inspection.	Stand inspection.
Command: PER- FORM PERIODIC INSPECTION.				
Supervise inspection.	Drain sediment from fuel tanks.	Mount to rear deck; help Driver clean engine and engine compartment.	Open engine doors and clean engine and engine compart- ment.	Mount to turret.
	Mount to turret.			Clean batteries and case.
	Clean turret.		Take mounted post.	Test batteries with hydrometer.
	Clean and touch up any rust spots in turret.			Bring cells to proper water level.
	Dismount.	Operate and check hull drain valves in engine compart- ment.	Clean Driver's com- partment and left interior of hull.	Operate auxiliary generator to charge batteries.
				Dismount.

Command: REPORT.

Report "Gunner
ready."

Take mounted post.

Clean Bog's compartment and right interior of hull.

Operate and check hull drain valves in Bog's compartment.

Help perform 250-mile lubrication.

Take mounted post; clean and touch up rust spots in Bog's compartment.

Report "Bog ready."

Operate and check hull drain valves in Driver's compartment.

Drive tank forward as required for tightening wedge nuts.

Perform 250-mile lubrication, referring to appropriate guide.

Close engine doors.

Take mounted post; clean and touch up rust spots in Driver's compartment.

Report "Driver
ready."

Help Gunner tighten wedge nuts and inspect track.

Help perform 250-mile lubrication.

Report "Loader
ready."

49. BEFORE OPERATION INSPECTION, M4A3. Tank locked and covered by tarpaulin. (NOTE: For training purposes, the inspection is divided into three phases, each phase being completed before the next is begun. Crew members secure tools as needed, report and correct deficiencies as found. The turret is traversed as necessary to facilitate the various operations.)

PHASE A

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: FALL IN; PREPARE FOR INSPECTION.				
Inspect crew.	Stand inspection.	Stand inspection.	Stand inspection.	Stand inspection.
Command: PER- FORM BEFORE OPERATION INSPECTION.				
Begin trip ticket; fill out during inspec- tion.	Help remove tarpau- lin.	Inspect ground be- neath tank for fuel, oil, or water leaks.	Remove and fold tar- paulin (3' x 6').	Help remove and fold tarpaulin. Check outside equip- ment.
Supervise inspection made by other crew members.	Mount left sponson; unlock Driver's hatch; enter tank. ¹	Mount to rear deck via right fender and sponson.	Lay tarpaulin to right of tank.	
Inspect tracks and tank suspension. (Visual check ade- quate for daily in- spection of wedge nuts.)	Unlock Bog's hatch; clear bow gun; take oilcan.	Check engine coolant level.		
	Move to turret.			

Take rammer staff.²

Unlock hatch.

Open turret hatch.

Elevate gun; traverse turret left to expose hand tools.

Check fuel level, including auxiliary generator tank.

Pass hand tools and oilcan to Driver.

Receive hand tools and oilcan; lay out on tarpaulin and check.

Open rear engine doors to permit ventilation.

Receive and stow muzzle covers.

Check final drive oil (3 piece unit only).

Remove muzzle covers; pass to Gunner.

Remove and stow breech covers; clear turret guns.

Command: REPORT.

Report "Gunner ready."

Report "Bog ready."

Report "Driver ready."

Report "Loader ready."

¹Unlock and enter by Cannoneer's hatch on tanks so equipped; modify subsequent procedure accordingly.

²Except on M4A3, 75-mm (wet) and 76-mm.

PHASE B

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM PHASE B.				
Mount to rear deck; help Bog open doors.	Traverse turret manually one revolution to the left; check azimuth indicator. ¹	Open top engine doors.	Take mounted post.	Take mounted post.
Assist Gunner in sight adjustment.	Make sight adjustment.	Check the following: Crankcase breather. Engine oil level. Fan belts. Engine compartment for fuel, oil, or water leaks. Emergency cans of oil. ³ Engine accessories for security and adjustment.	Close radio and battery master switches. Check the following: Steering levers. Gear shift lever. (Place in neutral.) Parking brake. Clutch free travel. Transmission oil level. Forward hull drain valves. Priming pump operation. Fuel cut-off operation.	Check pistol port. Check the following: Gun ammunition in turret and sponsors. ² Auxiliary generator: operation, tools, spare parts. (Allow to run while power traverse and stabilizer are operated, and in cold weather prior to starting engine.) Water containers. ³
Receive cleaning rods; swab bores of cannon and both machine guns.	Pass cleaning rods to Sergeant.			
Return cleaning rods to Gunner.	Receive and stow cleaning rods.	Listen for operation of fuel cut-off.		
Apply tape muzzle covers. ⁴	Check power traverse mechanism and hydraulic oil.	Close top engine doors.	Instruments. Siren. Compass.	Raise turret floor plate.
Check all hatch covers.	Level gun. Check gyrostabilizer: oil level, connections, cleanliness, operation.	Dismount.		Check: Rations. ³ Cooking stove. ³ Air cleaners.
Dismount.				

Help Loader check
air cleaners.

Turn off gyrosta-
bilizer.

Engage manual ele-
vation; check mech-
anism.

Check firing controls.

Check hull drain
valves in engine
compartment.

Drain fuel filter.

Help Driver check
lights.

Service lights and
blackout lights.

Open fuel valves,
right tanks.

Check:
Battery.
Hull drain valves be-
neath turret.
Fixed fire extin-
guishers and con-
trols.
Emergency cans of
oil.⁵
Decontaminating
apparatus.⁶
Drop turret floor
plate.

Command: REPORT.

Report "Gunner
ready."

Report "Bog ready."

Report "Driver
ready."

Report "Loader
ready."

¹ Traverse is made piecemeal and may be reversed for short distances to facilitate operations and checks.

² Ammunition left of power tunnel on M4A3, 76-mm. All gun ammunition on M4A3, 75-mm (wet).

³ Except in M4A3, 75-mm (wet) and 76-mm.

⁴ In bivouac and on nontactical marches commanders will decide whether permanent type muzzle covers will be em-
ployed for convenience or greater protection.

⁵ On M4A3, 75-mm (wet) and 76-mm only.

PHASE C¹

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow Gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PER- FORM PHASE C.				
Move to engine compartment.	Check the following:	Tighten exposed sprocket ring cap screws.	Start engine (operate at idle speed until temperature reaches 100° F).	Help Gunner check tools and spare parts.
Check automatic oil filter.	Gun tools and spare parts.			Mount AA gun; attach cartridge and belt link bags; check gun and mount (adjust head space).
Observe condition of exhaust.	Stabilizer oilcan.		During warm-up check:	Check the following:
Check engine for leaks, vibrating accessories, or parts.	Gun book.		Instruments.	Coaxial gun and mount; attach cartridge bag (adjust head space).
	Manuals and accident form. ⁴		Engine for smoothness of operation and unusual noises.	Smoke mortar and bombs.
Direct Driver to move tank forward one tank's length.	Submachine gun, ammunition and personal equipment.	Close rear engine doors. ⁵	Magnetos.	Hand fire extinguisher.
Take post at right idler.	Safety belt.			Hand grenades.
	Spare antenna.	Take post at left idler.	Drive tank forward at slow speed one tank's length.	Cal. .50 ammunition. ²
Inspect that part of track not visible before.	Caliber .50 ammunition.	Inspect that part of track not visible before.		Cal. .30 ammunition.
	Canvas bucket.			
	Check:			
	Periscope, spare, and spare heads (including knob settings).			

Observe action and condition of support rollers, blocks, and tank suspension as tank moves to rear.	Gunner's quadrant and case. Elevation quadrant. Telescope and mount.	Direct Driver to move to rear; tighten inside cap screws as exposed. Place tools in bag.	Drive tank to rear as directed by Bog.	Submachine gun, ammunition, and personal equipment.
	Receive tools and pass to Loader.	Pass tools to Gunner. ³	Check the following: Hood for Driver's hatch. Decontaminating apparatus. ² Hand fire extinguisher. Caliber .30 ammunition. ² Check chart. Manuals and accident form. ² Submachine gun, ammunition and personal equipment. Periscope, spare, and spare heads. Safety belt.	Receive tools from Gunner and stow.
Fold and pass tarpaulin to Gunner.	Secure tarpaulin to turret.	Open hatch.		Check:
Take mounted post.	Check gun and mount.	Take mounted post.		Periscope, spare, and spare heads.
Check the following: Submachine gun, ammunition, and personal equipment. Periscope, spare, and spare heads. Safety belt. Compass. Flag set. Binoculars. Water containers. ⁴ Rations. ⁴ Cooking stove. ⁴	Clean chamber and breech mechanism. Check recoil oil. Lock gun and turret in traveling position. Connect break-away plugs.	Check the following: Machine gun tools and spare parts. Bow gun, mount, and ammunition; attach cartridge bag (adjust head space). Caliber .30 ammunition in right sponson. ⁴ Submachine gun, ammunition and personal equipment. Gun ammunition beneath turret right of power tunnel. ⁶		Safety belt.
Mount antenna.			Connect break-away plugs.	Connect break-away plugs.

PHASE C¹—Continued

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Make 1st echelon radio check.		Check: Escape hatch. Periscope, spare, and spare heads. Safety belt. Tripod mount.		
Complete trip ticket.		Connect break-away plugs.		
Connect break-away plugs.				
Command: REPORT (interphone check).				
	Report "Gunner ready."	Report "Bog ready."	Report "Driver ready."	Report "Loader ready."
Report "Ready" to Platoon Leader.				

¹The flame thrower, on tanks so equipped, is checked in this phase. The crew member using the weapon checks its condition, mechanism, and the fuel level in its tank in accordance with the appropriate published guide. Where it is an alternate weapon to the bow machine gun it is mounted on order of the tank commander.

²Except in M4A3, 75-mm (wet) and 76-mm.

³Pass tools direct to Cannoneer on tanks with Cannoneer's hatch.

⁴On M4A3, 75-mm (wet) and 76-mm only.

⁵In closing rear engine doors, stay clear of path of falling exhaust deflector.

⁶Except on M4A3, 75-mm (wet).

50. INSPECTION DURING OPERATION, M4A3. This is a continuous process for all crew members.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Remain alert to unusual noises or conditions.	Check operation of— Elevation and traversing mechanisms.	Watch instruments.	Check all instruments carefully.	Check stowage of equipment in turret.
Check radio and interphone system.	Gyrostabilizer.	Listen for unusual noises.	Check controls.	Check security of— Coaxial gun.
Check security of— Radio antenna.	Check security of— Turret lock.	Check security of bow gun.	Listen for unusual noises.	Radio.
AA gun (except on M4A3, 76-mm).	Tank gun.			AA gun (on M4A3, 76-mm only).
Outside fixtures and equipment.				

51. INSPECTION AT THE HALT, M4A3. The length of halt determines how much of the following inspection will be completed and the normal priority of operations. The tank commander will be informed of the length of halt and will indicate how much time is to be allotted to inspection and how much for relief of the crew members. (During the inspection, the turret is traversed as necessary to facilitate those operations requiring it.)

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM HALT INSPECTION.				
Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.
Check radio for security.	Release turret lock.	Dismount.	Idle engine (run 2 minutes before stopping).	Turn on radio speaker.
Emerge from turret.	Elevate gun; check hand traverse.	Check final drives for leaks or excessive temperature.	Check instruments.	Move to AA Gunner's post; man AA gun.
Clean all turret periscopes and telescope.	Check sight adjustment.	Check under tank for fuel, oil, or water leaks.	Check Driver's and Bog's compartments for oil leaks.	
Supervise halt inspection.	Check auxiliary generator operation (leave on if necessary).	Check towing shackles.	Dismount; go to rear of tank.	
Inspect tracks and tank suspension.	Check coaxial gun and mount.		Open engine doors.	
	Check smoke mortar.		Check engine operation.	
	Check air cleaners.		Inspect engine compartment.	
	Open valves left fuel tanks (after 30 minutes operation).	Help Driver check lights.	Take mounted post.	
			Stop engine (use fuel cut-off).	
			Check service and blackout lights.	

Check operation of gyrostabilizer.	Check engine oil level.	Check the following: Steering levers. Gear shift lever. Parking brake. Clutch free travel. Transmission oil level.	
Check power traverse.	Close engine doors.		
Check firing controls.	Mount to rear deck.		
Check gun and mount.	Check engine coolant level.	Clean periscope.	
Place gun in traveling position.	Check fuel level in all tanks.	Connect break-away plugs.	
Lock turret lock.	Check outside equipment.		
Check stowage of equipment in turret.	Take mounted post.		
Connect break-away plugs.	Clean periscope.		Resume mounted post.
			Turn off speaker.
	Connect break-away plugs.		Connect break-away plugs.
Command: REPORT.	Report "Gunner ready."	Report "Driver ready."	Report "Loader ready."
	Report "Bog ready."		

52. AFTER OPERATION MAINTENANCE, M4A3. a. After operation, the tank is immediately given whatever servicing and maintenance is needed to prepare it in every way for further sustained action. This servicing covers all the points listed in the "Before operation inspection" and covers them in the same order, with obvious modifications. (For example, the tank is locked at the end of the inspection instead of being unlocked at the beginning; the check for leaks under the tank is more effective after it has stood for a while; battery switches are turned off rather than on and only after all checks requiring use of battery power; equipment is covered and stowed rather than being uncovered and made ready for use.)

b. The tank will be completely cleaned, serviced, and replenished (fuel, oil (all types), grease, coolant, ammunition (all types), first aid kit, water, and rations). *All special precautions against fire will be observed while refueling.* Crew members will perform the following additional operations not covered in the "Before operation inspection":

Tank commander

Command: PERFORM AFTER OPERATION MAINTENANCE.

Complete trip ticket; forward to Platoon Leader, together with report of any necessary 2d echelon maintenance, fuel, lubricants, ammunition, and rations required.

Gunner

Clean all weapons.

Bow gunner

Help Driver clean tank.

Help Gunner clean weapons.

Driver

Idle engine 2 minutes before stopping.

Clean tank suspension and outside of tank.

Help Gunner clean weapons.

Cannoneer

Help Gunner clean weapons.

53. PERIODIC ADDITIONAL SERVICES, M4A3. Services performed weekly in garrison; in combat and on maneuvers they are performed after each field operation.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: FALL IN; PREPARE FOR INSPECTION.				
Inspect crew.	Stand inspection.	Stand inspection.	Stand inspection.	Stand inspection.
Command: PERFORM PERIODIC INSPECTION.				
Supervise inspection.	Drain sediment from fuel tanks.	Mount to rear deck; help Driver clean engine and engine compartment.	Open engine doors and clean engine and engine compartment.	Mount to turret.
	Mount to turret.			Clean batteries and case.
	Clean turret.			Test batteries with hydrometer.
	Clean and touch up any rust spots in turret.	Operate and check hull drain valves in engine compartment.	Clean Driver's compartment and left interior of hull.	Bring cells to proper water level.
	Dismount.			Operate auxiliary generator to charge batteries.
				Dismount.

Take mounted post.

Clean Bog's compartment and right interior of hull.

Operate and check hull drain valves in Bog's compartment.

Operate and check hull drain valves in Driver's compartment.

Tighten all wedge nuts and inspect track.

Drive tank forward as required for tightening wedge nuts.

Help Gunner tighten wedge nuts and inspect track.

Help perform 250-mile lubrication.

Help perform 250-mile lubrication.

Perform 250-mile lubrication, referring to appropriate guide.

Help perform 250-mile lubrication.

Close engine doors.

Take mounted post; clean and touch up rust spots in Bog's compartment.

Take mounted post; clean and touch up rust spots in Driver's compartment.

Command: REPORT,

Report "Gunner ready."

Report "Bog ready."

Report "Driver ready."

Report "Loader ready."

54. BEFORE OPERATION INSPECTION, M4A6. Tank locked and covered by tarpaulin. (For training purposes, the inspection is divided into three phases, each phase being completed before the next is begun. Crew members secure tools as needed, report and correct deficiencies as found. The turret is traversed as necessary to facilitate the various operations.)

PHASE A

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: FALL IN; PREPARE FOR INSPECTION.				
Inspect crew.	Stand inspection.	Stand inspection.	Stand inspection.	Stand inspection.
Command: PER- FORM BEFORE OPERATION INSPECTION.				
Begin trip ticket; fill out during inspection.	Help remove tarpaulin.	Inspect ground beneath tank for fuel or oil leaks.	Remove and fold tarpaulin (3' x 6').	Help remove and fold tarpaulin. Check outside equipment.
Supervise inspection made by other crew members.	Mount left sponson; unlock Cannoneer's hatch; enter tank.	Mount to rear deck via right fender and sponson.	Lay tarpaulin to right of tank.	
Inspect tracks and tank suspension.	Elevate gun; traverse left 700 mils.	Check: Fuel level (including auxiliary generator tank).	Check final drive oil (three-piece unit only).	

(Visual check adequate for daily inspection of wedge nuts.)

Pass hand tools to Driver.

Remove and stow breech covers; clear turret guns.

Receive and stow muzzle covers.

Unlock tank Commander's hatch.

Enter Bog's compartment; open hatch.

Remove and stow bow gun breech cover; clear gun.

Pass oilcan to Driver.

Unlock Driver's hatch.

Take mounted post.

Command: REPORT.

Report "Gunner ready."

Engine oil level.

Open Sergeant's hatch.

Report "Bog ready."

Receive hand tools; lay out on tarpaulin and check.

Receive oilcan; place on tarpaulin.

Report "Driver ready."

Open rear engine doors to permit ventilation.

Remove muzzle covers; pass to Gunner.

Report "Loader ready."

PHASE B

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PER-FORM PHASE B.				
Mount to rear deck; help Bog open doors.	Traverse turret manually one revolution to the left; ¹ check azimuth indicator.	Open top engine doors.	Take mounted post.	Take mounted post.
Assist Gunner in sight adjustment.	Make sight adjustment.	Check the following: Engine compartment for fuel or oil leaks. Crankcase breather. Engine accessories for security and adjustment.	Close radio and battery master switches.	Check pistol port.
Receive cleaning rods; swab bores of cannon and both machine guns.	Pass cleaning rods to tank Commander.		Open fuel selector valve.	Check the following: Gun ammunition in turret and sponsons. ²
Return cleaning rods to Gunner.	Receive and stow cleaning rods.	Read engine hour meter.	Turn on instrument panel lights.	Auxiliary generator; operation tools, spare parts. (Allow to run while power traverse and stabilizer are operated, and in cold weather prior to starting engine.)
Apply tape muzzle covers. ⁴	Check power traverse mechanism and hydraulic oil.	Close top engine doors.	Check the following: Oil pressure warning light. Steering levers. Gear shift lever (place in neutral). Parking brake.	Water containers. ³
Check all hatch covers.		Dismount.	Clutch free travel. Transmission oil level.	Raise turret floor plate.
Dismount.	Level gun.	Check: Hull drain valves in engine compartment.	Forward hull drain valves. Instruments.	Check: Rations. ³ Cooking stove. ³

Check gyrostabilizer;
oil level, connections,
cleanliness, operation.

Turn off gyrostabilizer.

Engage manual elevation;
check mechanism.

Check firing controls.

Air cleaners.

Starter batteries.

Turn handles of fuel
filters one full turn.

Help Driver check
lights.

Siren.

Compass.

Service lights and
blackout lights.

Battery.

Hull drain valves
beneath turret.
Fixed fire extinguishers
and controls.

Emergency cans of
oil.

Decontaminating
apparatus.

Drop turret floor
plate.

Command: REPORT.

Report "Gunner
ready."

Report "Bog ready."

Report "Driver
ready."

Report "Loader
ready."

¹ Traverse is made piecemeal and may be reversed for short distances to facilitate operations and checks.

² Ammunition left of power tunnel on M4A6, 76-mm. All gun ammunition on M4A6, 75-mm (wet).

³ Except in M4A6, 75-mm (wet) and 76-mm.

⁴ In bivouac and on nontactical marches commanders will decide whether permanent type muzzle covers will be employed for convenience or greater protection.

PHASE C¹

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM PHASE C.				
Move to engine compartment.	Check the following:	Tighten exposed sprocket ring cap screws.	Check that governor shut-off lever is OFF.	Help Gunner check tools and spare parts.
Observe condition of exhaust.	Gun tools and spare parts.			
Check engine for leaks, vibrating accessories or parts.	Stabilizer oilcan.		Crank engine several turns. (Depress manifold heater button with starter button.)	Mount AA gun; attach cartridge and belt link bags; check gun and mount (adjust head space).
	Gun book, manuals, accident form. ³			
	Submachine gun, ammunition, and personal equipment.			
	Safety belt.		Move governor lever to RUN while cranking.	Check the following:
	Spare antenna.			Coaxial gun and mount; attach cartridge bag (adjust head space).
	Cal. .50 ammunition.		Operate engine at 800 rpm until oil pressure is stabilized. (Use manifold heater until engine fires regularly.)	Smoke mortar and bombs.
	Canvas bucket.			Hand fire extinguisher.
	Check:		During warm-up check:	Hand grenades.
	Periscope, spare and spare heads (including knob settings).		Instruments.	Caliber .50 ammunition. ²
	Gunner's quadrant and case.		Engine for smoothness of operation and unusual noises.	Caliber .30 ammunition.
	Elevation quadrant.			

Direct Driver to move tank forward one tank's length.	Telescope and mount.	Close rear engine doors.	Submachine gun, ammunition and personal equipment.
Take post at right idler.	Check gun and mount.	Take post at left idler.	Periscope, spare, and spare heads.
Inspect that part of track not visible before.	Clean chamber and breech mechanism.	Inspect that part of track not visible before.	Safety belt.
Observe action and condition of support rollers, blocks, and tank suspension as tank moves to rear.	Check recoil oil.	Direct Driver to move to rear; tighten inside cap screws as exposed.	Drive tank forward at slow speed one tank's length.
Fold and pass tarpaulin to Gunner.	Secure tarpaulin to turret.	Place tools in bag.	Check the following:
Take mounted post.	Lock gun and turret in traveling position.	Pass tools to Loader.	Hood for Driver's hatch.
Check the following:	Connect break-away plugs.	Take mounted post.	Decontaminating apparatus. ²
Submachine gun, ammunition, and personal equipment.		Check the following:	Hand fire extinguisher.
Periscope, spare, and spare heads.		Machine gun tools and spare parts.	Cal. .30 ammunition. ²
Safety belt.		Bow gun, mount, and ammunition; attach cartridge bag (adjust head space).	Check chart.
Compass.		Cal. .30 ammunition in right sponson. ³	Gun book, manuals, accident form. ²
Flag set.		Submachine gun, ammunition, and	Submachine gun, ammunition, and personal equipment.
Binoculars.			
Water containers. ³			

PHASE C¹ Continued

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Check the following: Rations. ³ Cooking stove. ³		Check the following: personal equipment. Gun ammunition beneath turret right of power tunnel. ⁴	Periscope, spare, and spare heads. Safety belt.	
Mount antenna.		Check: Escape hatch. Periscope, spare, and spare heads. Safety belt. Tripod mount.	Connect break-away plugs.	
Make 1st echelon radio check.		Connect break-away plugs.		
Complete trip ticket.				
Connect break-away plugs.				
Command: REPORT (interphone check).	Report "Gunner ready."	Report "Bog ready."	Report "Driver ready."	Report "Loader ready."

¹The flame thrower, on tanks so equipped, is checked in this phase. The crew member using the weapon checks its condition, mechanism, and the fuel level in its tank in accordance with the appropriate published guide. Where it is an alternate weapon to the bow machine gun it is mounted on order of the tank commander.

²Except in M4A6, 75-mm (wet) and 76-mm.

³On M4A6, 75-mm (wet) and 76-mm only.

⁴Except on M4A6, 75-mm (wet).

55. INSPECTION DURING OPERATION, M4A6. This is a continuous process for all crew members.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Remain alert to unusual noises or conditions.	Check operation of— Elevation and traversing mechanisms.	Watch instruments. Listen for unusual noises.	Check all instruments carefully. Check controls.	Check stowage of equipment in turret. Check security of— Coaxial gun.
Check radio and interphone system.	Gyrostabilizer.	Check security of bow gun.	Listen for unusual noises.	Radio. AA gun (on M4A6, 76-mm only).
Check security of— Radio antenna. AA gun (except on M4A6, 76-mm). Outside fixtures and equipment.	Check security of— Turret lock. Tank gun.			

56. INSPECTION AT THE HALT, M4A6. The length of halt determines how much of the following inspection will be completed and the normal priority of operations. The tank commander will be informed of the length of halt and will indicate how much time is to be allotted to inspection and how much for relief of the crew members. (During the inspection, the turret is traversed as necessary to facilitate those operations requiring it.)

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM HALT INSPECTION.				
Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.	Disconnect break-away plugs.
Check radio for security.	Release turret lock.	Dismount.	Idle engine (at 1,000 rpm for 5 minutes).	Turn on radio speaker.
Emerg from turret.	Remove breech covers.	Check final drives for leaks or excessive temperature.	Check instruments.	Move to AA Gunner's post; man AA gun.
Clean all turret periscopes and telescope.	Elevate gun; check hand traverse.		Check Driver's and Bog's compartments for oil leaks.	
Supervise halt inspection.	Check sight adjustment.	Check under tank for fuel or oil leaks.	Dismount; go to rear of tank.	
Inspect tracks and tank suspension.	Check auxiliary generator operation (leave on if necessary).	Check towing shackles.	Open engine doors. Check engine operation.	
	Check coaxial gun and mount.		Inspect engine compartment.	
	Check smoke mortar.		Take mounted post. Stop engine (using governor shut-off lever).	
	Check operation of gyrostabilizer.	Help Driver check lights.	Check service and blackout lights.	

Check power traverse.	Mount to rear deck.	Check the following: Steering levers.
Check firing controls.	Check: Engine oil level.	Gear shift lever.
Check gun and mount.	Fuel level (all tanks).	Parking brake.
	Air cleaners.	Clutch free travel.
Place gun in traveling position.		Transmission oil level.
	Close engine doors.	Clean periscope.
Lock turret lock.	Check outside equip- ment.	Connect break-away plugs.
Check stowage of equipment in turret.	Take mounted post.	
Connect break-away plugs.	Clean periscope. Connect break-away plugs.	

Resume mounted
post.

Turn off speaker.

Connect break-away
plugs.

Command: REPORT.

Report "Gunner
ready."

Report "Bog ready."

Report "Driver
ready."

Report "Loader
ready."

57. AFTER OPERATION MAINTENANCE, M4A6. a. After operation the tank is immediately given whatever servicing and maintenance is needed to prepare it in every way for further sustained action. This servicing covers all the points listed in the Before Operation Inspection and covers them in the same order, with obvious modifications. (For example, the tank is locked at the end of the inspection instead of being unlocked at the beginning; the check for leaks under the tank is more effective after it has stood for a while; battery switches are turned off rather than on and only after all checks requiring use of battery power; equipment is covered and stowed rather than being uncovered and made ready for use.)

b. The tank will be completely cleaned, serviced, and replenished (fuel, oil (all types), grease, coolant, ammunition (all types), first aid kit, water, and rations). *All special precautions against fire will be observed while refueling.* Crew members will perform the following additional operations not covered in the Before Operation Inspection.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: PERFORM AFTER OPERATION MAINTENANCE.				
Complete trip ticket; forward to Platoon Leader, together with report of any necessary 2d echelon maintenance, fuel lubricants, ammunition and rations required.	Clean all weapons.		Idle engine 3 to 4 minutes before stopping.	Help Gunner clean weapons.
		Help Driver clean tank.	Clean tank suspension and outside of tank.	
		Help Gunner clean weapons.	Help Gunner clean weapons.	

114 58. PERIODIC ADDITIONAL SERVICES, M4A6. Services performed weekly in garrison; in combat and on maneuvers they are performed after each field operation.

<i>Tank commander</i>	<i>Gunner</i>	<i>Bow gunner</i>	<i>Driver</i>	<i>Cannoneer</i>
Command: FALL IN; PREPARE FOR INSPECTION.				
Inspect crew.	Stand inspection.	Stand inspection.	Stand inspection.	Stand inspection.
Command: PERFORM PERIODIC INSPECTION.				
Supervise inspection.	Drain sediment from fuel tanks. Mount to turret. Clean turret. Clean and touch up any rust spots in turret. Dismount.	Mount to rear deck; help Driver clean engine and engine compartment. Operate and check hull drain valves in engine compartment. Take mounted post.	Open engine doors and clean engine and engine compartment. Take mounted post. Clean Driver's compartment and left interior of hull.	Mount to turret. Clean batteries and case. Test batteries with hydrometer. Bring cells to proper water level. Operate auxiliary generator to charge batteries.

Clean Bog's compartment and right interior of hull.

Operate and check hull drain valves in Bog's compartment.

Operate and check hull drain valves in Driver's compartment.

Tighten all wedge nuts and inspect track.

Drive tank forward as required for tightening wedge nuts.

Help Gunner tighten wedge nuts and inspect track.

Help perform 250-mile lubrication.

Help perform 250-mile lubrication.

Perform 250-mile lubrication, referring to appropriate guide.

Help perform 250-mile lubrication.

Close engine doors.

Take mounted post; clean and touch up rust spots in Bog's compartment.

Take mounted post; clean and touch up rust spots in Driver's compartment.

Command: REPORT.

Report "Gunner ready."

Report "Bog ready."

Report "Driver ready."

Report "Loader ready."

SECTION X

SIGHT ADJUSTMENT

59. FIELD CHECK OF SIGHTS. Frequent checking of the sights is vital in the field. The check is performed as follows: Select a suitable aiming point as for sight adjustment in paragraph 60a below. Line the cross hairs of the telescope on the aiming point, and check to see whether the cross hairs of the periscopic telescope also coincide on the same point. If they do, the sights may be safely assumed to be still in adjustment. If they do not, the adjustment has slipped and a new sight adjustment must be made for both sights. At the same time the vertical alignment of the vane sight should be similarly checked, and it should be adjusted if necessary.

60. SIGHT ADJUSTMENT. Sights are said to be in adjustment when the axis of the gun tube is parallel to the line of sighting of the telescope. For practical purposes these lines are considered parallel when they converge on a point not less than 1,500 yards distant.

a. Distant aiming point. To make a sight adjustment in the field under conditions of good visibility, select a point at least 1,500 yards away, and preferably one having distinct straight lines which intersect so that there will be no chance of mistaking the aiming point chosen. The vertical and horizontal lines of buildings, telegraph poles, etc., are best since they make possible the most accurate alignment of the cross hairs. Line the gun tube on the distant point selected, using the issue bore sights if they are available, or improvising cross hairs for the muzzle and sighting through the firing pin well of the closed breechblock. Then, using whatever means are provided for the purpose, move the sight vertically and horizontally until the line of sighting coincides with the cross hairs

on the aiming point. If there is a clamping device to secure the adjustment, a final check should be made after it is tightened to be sure the tightening has not thrown the adjustment off.

b. Testing target. In close country or jungle, or where visibility is otherwise reduced, the use of the testing target may be necessary. Set it up at least 80 feet from the gun, making sure to have the same cant in the horizontal axis of the target as is present in the tube (the gunner's quadrant may be used for this purpose). The tube is first aligned on its portion of the test target, and then the sight is moved until it centers on its corresponding portion.

SECTION XI

DESTRUCTION OF EQUIPMENT

61. GENERAL. a. The destruction of matériel requires a command decision and normally will be undertaken only on authority delegated by division or higher commanders. In either case, destruction is ordered only after every possible measure for the preservation or salvage of the matériel has been taken, and when in the judgment of the deciding authority such action is necessary to prevent—

(1) Its abandonment in the combat zone.

(2) Its capture intact by the enemy.

(3) Its use by the enemy, if captured, against our own or allied troops.

(4) Knowledge of its existence, functioning, or exact specifications from reaching enemy intelligence.

b. The principles to be followed are:

(1) Methods for the destruction of matériel subject to capture or abandonment in the combat zone must be adequate, uniform, and easily followed in the field.

(2) Destruction must be as complete as available time, equipment, and personnel will permit. If thorough destruction of all parts cannot be completed, the most important features of the matériel should be destroyed, and parts essential to the operation or use of the matériel which cannot be easily duplicated, should be ruined or destroyed. The same essential parts must be destroyed on all like units to prevent the enemy from constructing one complete unit from several damaged ones by "cannibalism."

c. Crews will be trained in the prescribed methods of destruction, but training will not involve the actual destruction of matériel.

d. (1) The methods outlined in the paragraphs below are

given in order of effectiveness. If method No. 1 cannot be used, destruction should be accomplished by one of the other methods in order of priority shown. Adhere to the sequences.

(2) Certain methods require special tools and equipment, such as TNT and incendiary grenades; which normally may not be items of issue. The issue of such special tools and matériel, the vehicles for which issued, and the conditions under which destruction will be effected are command decisions in each case, according to the tactical situation.

62. DESTRUCTION OF TANK GUN. Remove sights. If evacuation is possible, carry the sights; if evacuation is not possible, thoroughly smash all periscopic sights. Drain the oil from the gyrostabilizer system; smash the oil lines; smash the control box thoroughly, or place an M14 incendiary grenade on the box and pull the pin.

a. Method No. 1. (1) Open drain plugs on recoil mechanism, allowing recoil fluid to drain. *It is not necessary to wait for the recoil fluid to drain completely before firing the cannon as in (4) below.*

(2) Place an *armed (safety pin removed)* M9A1 antitank grenade, HE, or *armed (safety pin removed)* M6 antitank rocket in the tube about 6 inches in front of, and with the ogive nose end toward the HE shell, as in (3) below.

(3) Set fuse on an HE shell at "superquick," insert shell in the gun, and close the breech. An armor-piercing shell cannot be used in this method.

(4) Attach a piece of string to the firing linkage in such a way that the gun may be fired by pulling the string. Dismount from the tank (down to the left rear) and fire the piece. Elapsed time: Approximately 2 to 3 minutes.

b. Method No. 2. (1) See a(1) above.

(2) Fire an HE round, assembled with a point-detonating fuze, against a similar round jammed in the muzzle. Take same precautions as in a(4) above.

c. Method No. 3. Insert two or three TNT blocks in the bore near the muzzle, four to six in the chamber of the gun. Close the breechblock as far as possible without damaging the safety fuze. Plug the muzzle tightly with earth to a distance

of approximately 9 inches from the muzzle. Detonate the TNT charges simultaneously.

d. Method No. 4. With another gun, fire HE or AP projectiles at the tube of the gun until it is rendered useless.

e. Method No. 5. Insert four *unfuzed* M14 incendiary grenades, end to end, midway in the tube at 0° elevation. Ignite these four grenades with a fifth equipped with a 15-second Bickford fuze. The metal from the grenades will fuze with the tube and fill the grooves. Elapsed time: 2 to 3 minutes.

f. Destruction of gyrostabilizer. (1) Drain oil from system.

(2) Smash oil lines.

(3) Smash control box.

(4) Place an M14 incendiary grenade on the control box and pull the pin.

63. DESTRUCTION OF MACHINE GUNS. **a. Method No. 1.** (1) *Caliber .30 machine gun.* Field strip. Use barrel as a sledge. Raise cover until vertical; smash cover down toward front. Deform and break backplate; deform T-slot. Wedge lock frame, back down, into top of casing between top plate and extractor cam; place chamber end of barrel over lock frame depressors and break off depressors. Insert barrel extension into back of casing, allowing the shank to protrude; knock off shank by striking with barrel from the side. Deform and crack casing by striking with barrel at side plate corners nearest feedway. Elapsed time: 2½ minutes.

(2) *Caliber .50 machine gun.* Field strip. Use barrel as a sledge. Raise cover; lay bolt in feedway; lower cover on bolt; smash cover down over bolt. Deform backplate. Wedge buffer into rear of casing allowing depressors to protrude; break off depressors by striking with barrel. Lay barrel extension on its side. Hold down with one foot, break off the shank. Deform casing by striking side plates just back of the feedway. Elapsed time: 3½ minutes.

b. Method No. 2. Insert bullet point of complete round into muzzle and bend case slightly, distending mouth of case to permit pulling of bullet. Spill powder from case, retaining sufficient powder to cover the bottom of case to a depth of approximately ⅛ inch. Reinsert pulled bullet, point first, into the case mouth. Chamber and fire this round with the reduced

charge; the bullet will stick in the bore. Chamber one complete round, lay weapon on ground, and fire with a 30-foot lanyard. Use the best available cover, as this means of destruction may be dangerous to the person destroying the weapon. Elapsed time: 2 to 3 minutes.

c. **Small arms.** Small arms cannot be adequately destroyed by firing with the bore stuck in the ground, with or without a bullet jammed in the muzzle.

d. **Machine-gun tripod mount, caliber .30, M2.** Use machine-gun barrel as a sledge. Deform traversing dial. Fold rear legs, turn mount over on head, stand on folded rear legs, knock off traversing dial locking screw, pintle lock, and deform head assembly. Deform folded rear legs so as to prevent unfolding. Extend elevating screw and bend screw by striking with barrel; bend pintle yoke. Elapsed time: 2 minutes.

64. DESTRUCTION OF TANK. a. Method No. 1. (1) Remove and empty the portable fire extinguishers. Smash the radio (par. 67). Puncture fuel tanks. Use fire of caliber .50 machine gun, or a cannon, or use a fragmentation grenade for this purpose. Place TNT charges as follows: 3 pounds between engine oil cooler and right fuel tank; 2 pounds under left side of transmission as far forward as possible. Insert tetryl nonelectric caps with at least 5 feet of safety fuze in each charge. Ignite the fuzes and take cover. Elapsed time: 1 to 2 minutes, if charges are prepared beforehand and carried in the vehicle.

(2) If sufficient time and materials are available, additional destruction of track-laying vehicles may be accomplished by placing a 2-pound TNT charge about the center of each track-laying assembly. Detonate those charges in the same manner as the others.

(3) If charges are prepared beforehand and carried in the vehicle, keep the caps and fuzes separated from the charges until used.

b. **Method No. 2.** Remove and empty the portable fire extinguishers. Smash the radio (par. 67). Puncture fuel tanks (see a(1) above). Fire on the vehicle using adjacent tanks, antitank or other artillery, or antitank rockets or grenades. Aim at the engine through opened doors, suspension, and armament in the order named. If a good fire is started, the

vehicle may be considered destroyed. Elapsed time: About 5 minutes per vehicle. Destroy the last remaining vehicle by the best means available.

65. DESTRUCTION OF AMMUNITION. a. General.

(1) Time will not usually permit the destruction of all ammunition in forward combat zones.

(2) When sufficient time and materials are available, ammunition may be destroyed as indicated below. At least 30 to 60 minutes may be required to destroy adequately the ammunition carried by combat units.

(3) In general, the methods and safety precautions outlined in TM 9-1900, should be followed whenever possible.

b. Unpacked complete round ammunition. (1) Stack ammunition in small piles. (Small arms ammunition may be heaped.) Stack or pile most of the available gasoline in cans and drums around the ammunition. Place on pile all available inflammable material such as rags, scrap wood, and brush. Pour the remaining available gasoline over the pile. Sufficient inflammable material must be used to insure a very hot fire. Ignite the gasoline and take cover.

(2) Destroy 75-mm ammunition by sympathetic detonation, using TNT. Stack the ammunition in two stacks about 3 inches apart, with fuzes in each stack toward each other. Place TNT charges between the stacks. Use 1 pound of TNT per four or five rounds of ammunition. Detonate all charges of TNT simultaneously from cover.

c. Packed complete round ammunition. (1) Stack the boxed or bundled ammunition in small piles. Cover with all available inflammable materials, such as rags, scrap wood, brush, and gasoline in drums or cans. Pour gasoline over the pile. Ignite the gasoline and take cover. (Small arms ammunition must be broken out of the boxes or cartons before burning.)

(2) (a) The destruction of packed complete round ammunition by sympathetic detonation with TNT is not advocated for use in forward combat zones. To insure satisfactory destruction involves putting TNT in alternate cases or bundles of ammunition, a time-consuming job.

(b) In rear areas or fixed installations, sympathetic detonation may be used to destroy large ammunition supplies if destruction

by burning is not feasible. Stack the boxes, placing in alternate boxes in each row sufficient TNT blocks to insure the use of 1 pound of TNT per four to five rounds of 75-mm ammunition. Place the TNT blocks at the fuze end of the rounds. Detonate all TNT charges simultaneously. See FM 5-25 for details of demolition planning and procedure.

d. Miscellaneous. Grenades, antitank mines, and antitank rockets may be destroyed by the methods outlined in b and c above for complete rounds. The amount of TNT necessary to detonate these munitions is considered less than that required for detonating artillery shells. Fuzes, boosters, detonators, and similar material should be destroyed by burning.

66. FIRE CONTROL EQUIPMENT. Fire control equipment, including optical sights and binoculars, is difficult to replace. It should be the last equipment to be destroyed. If evacuation of personnel is made, all possible items of fire control equipment should be carried. If evacuation of personnel is not possible, fire control equipment must be thoroughly destroyed as indicated below.

a. Firing tables, trajectory charts, slide rules and similar items should be thoroughly burned.

b. All optical equipment that cannot be evacuated will be thoroughly smashed.

67. RADIO EQUIPMENT. **a. Books and papers.** Instruction books, circuit and wiring diagrams, records of all kinds for radio equipment, code books, and registered documents will be destroyed by burning.

b. Radio sets. (1) Shear off all panel knobs, dials, etc., with an ax. Break open the set compartment by smashing in the panel face, then knock off the top, bottom, and sides. The object is to destroy the panel and expose the chassis. On top of the chassis, strike all tubes and circuit elements with the ax head. On the under side of the chassis, if it can be reached, use the ax to shear or tear off wires and small circuit units. Break sockets and cut unit and circuit wires. Smash or cut tubes, coils, crystal holders, microphones, earphones, and batteries. Break mast sections and break mast base at the insulator.

(2) When possible, pile up smashed equipment, pour on gas or oil, and set it on fire. If other inflammable material, such as wood, is available, use it to increase the fire. Bury smashed parts.

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